

100% TRAINING p 66 How 13 mining companies put it across
BRIDGE CONVEYORS p 72 Loader-conveyor team mines 44 tpm
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STRIPPING TODAY.....p 80
What it takes in equipment and methods

NO BELT RUNAWAYS ... p 94
Mine-built device prevents belt pile-ups

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Reinsulate with U. S. Uskorona and "D. R." Tapes



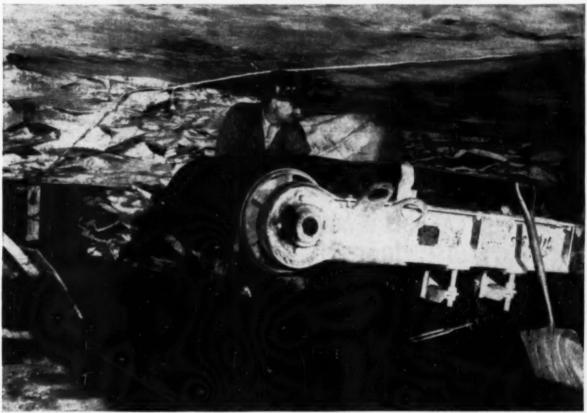
A cable becomes as good as new when you reinsulate with Uskorona and re-jacket with "D.R." splicing compound. The "D.R." compound provides an outside vulcanized covering. These completely reliable tapes give:

- Extra-tight grip plus high tensile strength.
- They stand up under acid, alkalies and moisture...ideal for mining machine cables.
- Dangerous leaks can't occur, because pinholes are impossible.
- · Absolutely waterproof.

Like all the tapes and splicing compounds in United States Rubber Company's complete line, Uskorona was developed for specific operating conditions, yet can handle a wide range of electrical and general purpose jobs. It exceeds A.S.T.M. specifications. Get in touch with any of our numerous distributors or one of our 25 District Sales Offices, or write to address below.

"U.S." Research perfects it
"U.S." Production builds it
U.S. Industry depends on it

UNITED STATES RUBBER COMPANY
MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.



B. F. Goodrich cord belt troughs to fit light or heavy loads

A CONVEYOR belt should trough naturally under light loads as well as heavy. Otherwise the belt loses complete contact with the idlers and runs off center, wears along the edges. Costly belt damage results.

In the B. F. Goodrich cord belt these problems have been eliminated. There's a ply of parallel cords, running lengthwise, built into both the top and bottom of the belt. Each cord is completely surrounded by rubber—no cross threads tie them together. There being no



crossweave in the cord plies, the cord belt is more flexible, and so troughs and tracks perfectly whether empty, lightly or fully loaded. (See small picture at left). Spillage is reduced, belt keeps centered on idlers, requires less maintenance.

The B. F. Goodrich cord belt shown above had been in use six years when the picture was taken, and is in such good condition, engineers predict it will give years of additional service. While it only handles 65-100 tons-per-hour, troughing is natural; there's been no maintenance due to edge wear.

Natural troughing is just one of the reasons B. F. Goodrich Caricoal cord belts last longer, serve better. Other construction features provide high impact resistance and double protection against mildew. So before you place your next order for belting, let a BFG

distributor show you how these longerlasting conveyor belts can cut your coal handling costs, or send for the free booklet describing the B. F. Goodrich Caricoal line of conveyor belts.

The B. F. Goodrich Company Dept. M-98, Akron 18, Obin

Without cose or obligation, please

send me booklet about B. F. Goodrich conveyor

have a BFG distributor see me.

Name

Company____

Address.

1

B.F. Goodrich

DIVISION

Why you can get increased tonnage . . . at less cost . . . with these Carboloy. Cemented Carbide Mining Tools

CARBOLOY MINING TOOLS OUTLAST STEEL TOOLS BY UP TO 50 TIMES

Carboloy Mining Tools are made of the hardest metal made by man — Carboloy Cemented Carbide. They're many times harder than the toughest steels . . . harder than any coal deposit or rock. That's why they work continuously, at faster speeds and for longer periods than steel tools. That's why they can be sharpened many times . . . long after steel tools are sc pped.

Actual mine tests prove that Carboloy Ce-

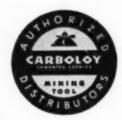
mented Carbide Mining Tools consistently give results like these:

Production increased 10% to 20% per shift Downtime reduced to a fraction of the time previously required

Power consumption lowered 25% to 40% Tool replacement costs sharply reduced Manpower and machinery conserved

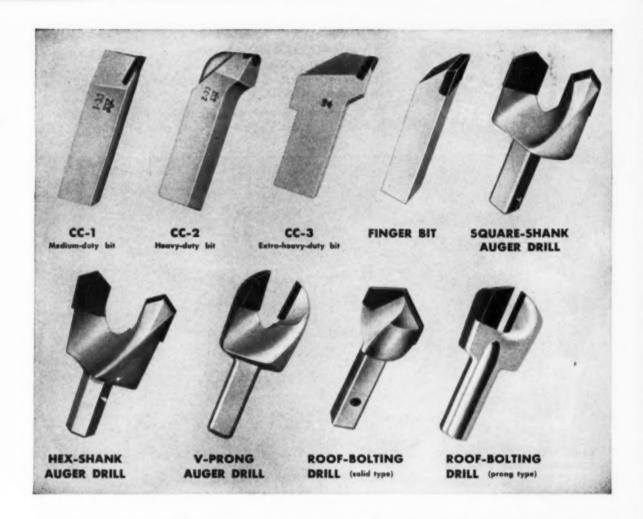
2 CARBOLOY MINING TOOLS ARE STOCKED LOCALLY FOR IMMEDIATE DELIVERY

Twenty Authorized Carboloy Mining Tool Distributors, strategically located across the nation's mining areas, are prepared to give you fast delivery on all your Carboloy Mining Tool orders. Their trained specialists can give you the latest information on carbide tool use and maintenance techniques. All it takes is a call to your local Distributor, listed below:



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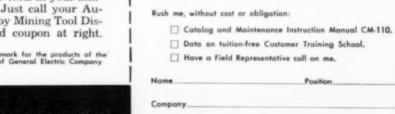
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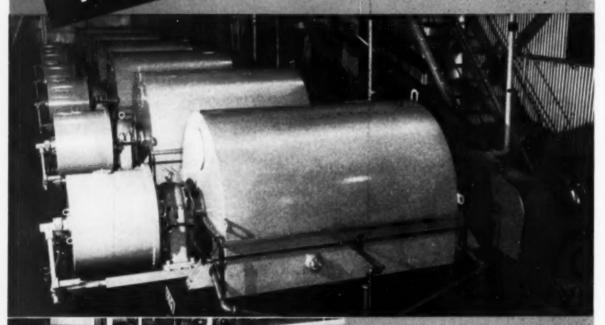
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If it contains fine, high ash particles, they can easily be

rinsed out, reducing moisture content by as much as 50% and improving coal quality.

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polish up your coal cleaning water after it receives a simple, inexpensive floccing treatment. The slimes go to refuse and the water from the system goes back to the washer so clean it can be recirculated indefinitely. No more sludge pends. No more pollution problems.

BIRD
MACHINE COMPANY

SOUTH WALPOLE . MASSACHUSETTS



Ahead in '54

"COST CUTTING BEHIND THE FACE" will lead off the January issue of Coal Age. Since low cost is now as much as ever one of the industry's major problems-and competitive weapons-this sixth special report in the Coal Age series inaugurated in January, 1953, also will key the Coal Age approach to the problems of mining in 1954. Thus, the schedule calls for a special "Preparation Guidebook" in March and additional special reports on "Cost Cutting Through Maintenance" and "Cost Cutting Through Safety" in issues to follow. For refresher purposes, reports in 1953 were:

"Cost Cutting Today," January.

"Efficiency-Machine-Made," May. "How to Cut Cost With Modern Equipment and Modern Materials,

"Cutting Cost in Stripping," September.

July.

"Cost Cutting at the Face," November.

PRINCIPLES AND PRACTICE

Principles translated into practice generate results in the field, and Coal Age will continue to concentrate on results and how they are attained in 1954. Examples planned for January and immediately following issues include:

Where wood pins for roof support fit in and what they do-A report on experience at Mary Gail No. 3 mine. where roof-support cost has been cut approximately \$30,000 but experience has shown that steel bolts are best for places that must stand for several years in this particular operation.

Modern transportation for continuous mining-An analysis of the problems and suggestions for methods and equipment for continuous operation and maximum production per unit,

COAL AGE

DECEMBER, 1953

VOLUME 58

NUMBER 12

(with which are combined The Colliery Engineer and Mines and Minerals)

iblished monthly on the 1st by McGraw-Hill Publish-g Company, Inc., James H. McGraw (1860-1948), under, Member ABC and ABP, Publication Office: 99 Noble St., Philadelphia 23, Pa.

1309 Noble St., Philadelphia 23, Pa.
Executive, Editorial and Advartising Offices: McGrawHill Batiding, 330 W. 42nd St., New York 36, N. Y.
Donald C. McGraw, Philadert, Willard T. Cheraller,
Donald C. McGraw, Philadert, Willard T. Cheraller,
Postleder and Treasurer: John J. Contt. Servetary;
Paul Montgomery Sendor Vice President, Publications
Division: Raiph B. Smith Vice President And Editorial Director of Advertising; J. E. Blackburn, Jr., Vice
President and Director of Circulation.

Subscription: Address all correspondence to COAI AGE—Subscription Service, 1309 Noble St., Philadelphia 23, Pa., or 330 W. 42nd St., New York 36, N. Y

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month for change of address. Subscriptions are only from management, production and main-neutives and engineers in the ossi-maining Position and company connection must be on subscription orders. pgies U.S. and possessions and Canada, 50; countries \$1.50. On rates; United Nates and possessions, \$5 page, \$5 for two years, \$10 for three years

Canada, 46 for one year, \$10 for two years, \$12 for three years. Other Countries in the Western Hemisphere, \$10 for one year, \$16 for two years, \$20 for three years. All other countries, \$15 for one year \$25 for two years, \$20 for three years. \$40 for three years, \$20 for \$25 for two years, \$20 for three years, \$20 for \$25 for two years, \$20 for three years, \$20 for \$25 for two years, \$20 for three years, \$20 for yea

annually in December and District Managers: Atlants 3 Branch Offices and District Managers: Atlants 3 H. H. Stdar; Chicago 11. F. W. Roets and G. A. Mark; Cleveland 15. W. M. Spears; Dallas 1. J. H. Casti; Los Angeles 11. B. Distinger S. York and New England; Philadelphia 3. W. A. Poster; Pittaburgh 23. H. C. Chelleno; St. Louis, 1. F. W. Roets; San Francisco 4. J. W. Otterson; Roston, 16; Washington 4. McGraw-Hill House, 95 Farrington Rt. London E. C. 4.
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HOW TO ADD LIFE TO YOUR ROPE



IRST on the list of good maintenance practices is effective lubrication. Use *Texaco Crater* — the *penetrating* lubricant that keeps rope strong longer, cuts maintenance costs.

Texaco Crater goes right to the heart of your rope, surrounding the core with its preservative film. At the same time, it coats the strands thoroughly with a tough, clinging lubricant that affords long-lasting protection against wear and rust.

For open gears, too, *Texaco Crater* is ideal. It clings to the gear teeth, does not channel or throw off, stands up under shocks and heavy loads. You get quieter operation, longer gear life.

For greater convenience in both applications, use *Texaco Crater X Fluid*. It goes on as a liquid (without heating!) and stays on even in coldest weather.

In hydraulic mechanisms, use Texaco Regal Oil (R & O). Tests prove it has more than ten times the oxidation-resistance of ordinary turbine-quality oils. Keeps sludge, rust and foam out of systems.

Let a Texaco Lubrication Engineer help you add life to all your equipment. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.







I Sure Like Roof Bolts!

"I've been around mines a long time, and I've seen many improvements over the years. But the one that really strikes me is these roof bolts. Now take this mine. We're using roof bolts in all new workings. It cuts down our accident rate, and gives us more room for mechanized equipment. I'm sold on 'em."

In many mines, operators are obtaining increased production and promoting greater safety for workers by using roof bolts in entries and air courses. This method of roof control eliminates the need for space-consuming timber supports, and improves ventilation.

To enable operators to obtain these desirable conditions, Bethlehem produces two types of roof bolts:

SQUARE-HEAD BOLT—The ¾-in. square-head bolt is furnished with an expansion shell, and is for use in a 1¾-in. hole. It has rolled threads and an unchamfered head. Pressed ears on shank support the shell during anchoring. When bolt is tightened, the leaves of shell expand, locking against sides of hole to provide holding pressure.

SLOTTED BOLT—This 1-in. bolt has a well-centered, forged slot to receive a steel wedge. No metal is removed by slotting. The other end of bolt has 5 in. of 1-in. rolled threads. When driven in 1½-in. hole, the wedge is forced into slot, expanding bolt-end. Truncated-cone point prevents thread damage. Fitted with American Standard Regular Square Nut.

Bethlehem Roof Bolts come in lengths of from 2 ft to 8 ft, and can be installed vertically or at angles. Shipment can be made promptly from stock. For full details, write to us at Bethlehem, Pa.

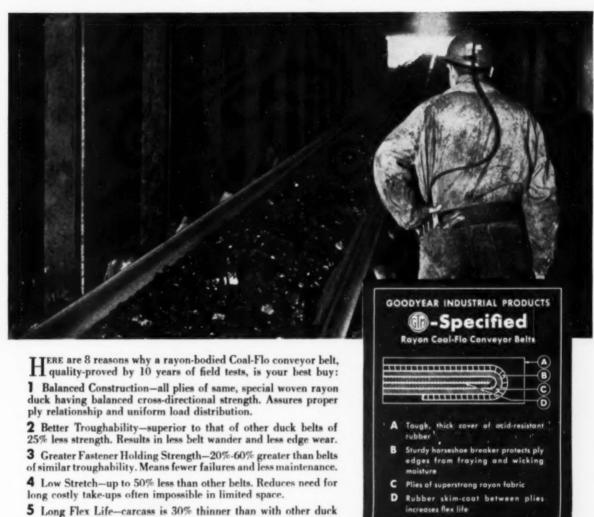
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BETHLEHEM MINE ROOF BOLTS



RAYON Makes Coal-Flo Conveyor Belting 8 Ways Better



belts of same strength. Bending is easier—flex resistance greater.

6 Light Weight—rayon weighs 35% less than ordinary fabrics of

6 Light Weight—rayon weighs 35% less than ordinary fabrics of equal strength. Permits higher pay load. Makes belt easier to handle.

7 High Tear Resistance—strong transverse threads resist lengthwise tears better than heavier, stiffer ducks. Cuts down on repairs.

8 Mildew Resistance—exclusive inhibitor, thoroughly proved in 25 years of field use, protects belt against mildew-caused rot.

For more reasons why you should buy Coal-Flo, see your G.T.M.—Goodyear Technical Man.

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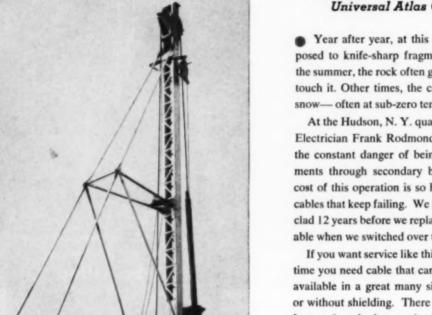
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"Toughest operating but the first batch of



THIS IS A TYPICAL DRILL. It uses a

4-conductor No. 8 Amerclad cable.

Says Chief Electrician, Hudson Plant, Universal Atlas Cement Company

● Year after year, at this quarry, the Amerclad is exposed to knife-sharp fragments of flying rock. During the summer, the rock often gets so hot that you can't even touch it. Other times, the cable lies out in the rain and snow—often at sub-zero temperatures.

At the Hudson, N. Y. quarry of Universal Atlas, Chief Electrician Frank Rodmond said, "This Amerclad runs the constant danger of being hit with flying rock fragments through secondary blasting. Yet the down-time cost of this operation is so high that we just can't stand cables that keep failing. We kept that last batch of Amerclad 12 years before we replaced it, yet it was still serviceable when we switched over to new Amerclad."

If you want service like this, specify Amerclad the next time you need cable that can really take it. Amerclad is available in a great many sizes and constructions, with or without shielding. There is a type to power anything from a river dredge or mine locomotive down to a rough and tumble electric hand drill. Send the coupon, and get more information.

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A STANDARD Cable for

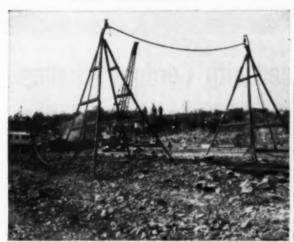
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U-S-S AMERICAN ELECTRICAL

condition in our quarry— Amerclad lasted 12 years"



NOTICE THE CABLE TRAY fastened to the shovel. This was developed by Universal Atlas for easier cable handling—it also prolongs life of the cable.



HERE A CABLE is raised on horses to clear the railroad track. It



TWO WORKMEN WATCH from blast shelter as charge is set off in distance. Low horses cushion cable from shock of falling rock in secondary blast areas.

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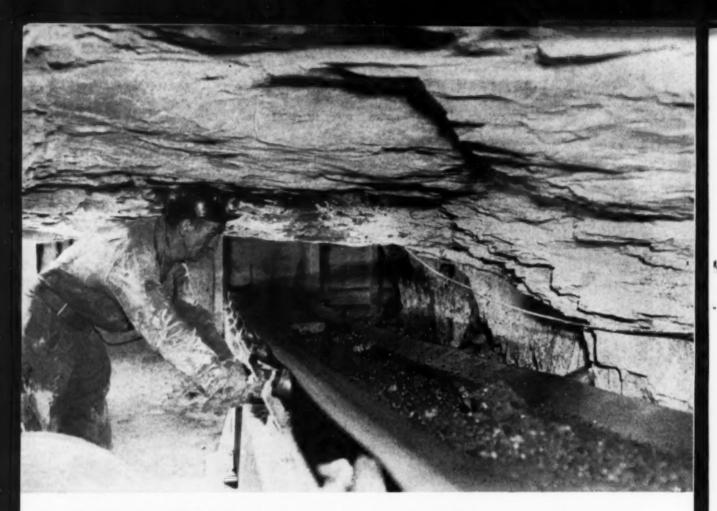
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UNITED STATES STEEL



Buchanan County Coal Co. reports: 1600-ft. belt reinforced with "Cordura" handles 16-hour-per-day production with minimum maintenance



View of belt reinforced with "Cordura" at discharge end. One motor is all that is required to move entire mine production to loading point. Operators report a great increase of efficiency over the old method of mine-car loading. Operating continuously for 16 hours per day, the conveyor belt shown above carries coal and bituminous by-products from the face of the mine to the mine cars. The belt, manufactured by Raybestos-Manhattan, Inc., gets its stretch-free strength from Cordura* reinforcement. Although the belt line is level, at times the floor has raised in places, putting great stress on the belt. Operators of the Buchanan County Coal Company, Big Rock, Va., report, however, that the conveyor belt reinforced with "Cordura" has stood the strain without trouble. It has been in service over four years, requiring practically no maintenance.

Engineers report better troughing and training when belts are sinewed for strength with Du Pont "Cordura". And the low stretch of "Cordura" means less downtime for take-ups, resplicing. Loaded or empty, these belts ride firmly on the center idler.

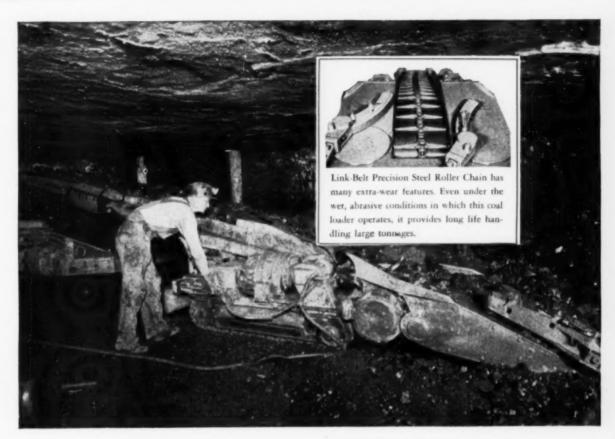
Find out more about the advantages of belts reinforced with "Cordura". Write for names of suppliers, and for your copy of the free booklet: "Sinews for Industry". Address: Textile Fibers Dept., Room 2520-C, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware,

Du Pont "Cordura" High Tenacity Rayon

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QUPONT

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Typical chains from the complete LINK-BELT line



Ewart Detachable Link-Belt, in malleable or Promal, for drives and power transmission.



Malleable roller chain for conveyors or inclined elevators where reduced chain pull is desired.



Class H Pintle chain excellent for conveyors that slide because of broad wearing surfaces.



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LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia), Sales Offices, Factor Branch Stores and Distributors in Principal Cities. 12.4

You'll find the answer in LINK-BELT's complete chain line... a size and type for every need

WHETHER it's a high-hp, heavy-impact drive or relatively slow-speed conveying service—you can get the *one* chain that best meets your needs from Link-Belt's complete chain line. Our engineers will be glad to work with you—help you select the right chain for your requirements. And you can be sure that any Link-Belt chain you buy is quality-built for longer life.



CHAINS AND SPROCKETS



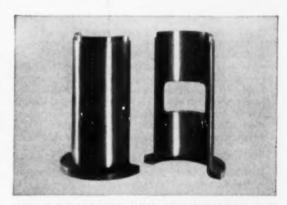


You get more miles for your bearing dollar with genuine G-E motor suspension bearings

Present demands to "get the coal out faster" mean even more rigorous service daily for your mine locomotives. To help keep the running gear on your G-E mine locomotives in constant readiness for the day's haul, it's a good idea to specify genuine G-E traction motor suspension bearings the next time you need replacements.

Their "just-right" alloy composition resists breakage and wear, and provides many miles of low-maintenance, reliable, mine-haulage service. Their rigid construction—they fit tight in axle caps—means still less wear on bearings and traction motor gearing. Keyways cut in top halves engage key in frame, hold bearings securely in place, reduce wear on cap and bearing. As an added convenience, new bearings are available for your used ones under the terms of G.E.'s Exchange Plan.

To get top performance—"original equipment" performance—from your G-E mine locomotives, always specify genuine G-E traction motor suspension bearings. They're the best you can buy for your G-E mine locomotives. For full pricing and product information, contact your nearest G-E Apparatus Sales office. General Electric Co., Schenectady 5, N. Y.

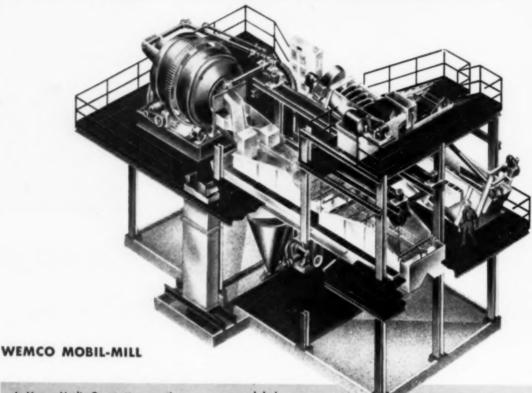


HOW G-E BEARINGS KEEP MAINTENANCE LOW

Available for a variety of track gages, G-E traction motor suspension bearings keep replacement costs low, help keep mine locomotive availability high. They're made from an alloy which is ideal for the type of relatively low surface speed found in mining operations. They're not babbitted but are accurately machined to a smooth surface, assuring many miles of economical, low-maintenance service.

GENERAL (ELECTRIC

have you ever wanted to buy "experience"?



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EFFICIENT CLEANING—accurate, consistent separations with high yield over a wide range of sizes and grades.

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MINIMUM PIRST COST — comparatively small capital investment per ton of washed coal.

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SINGLE DRUM — for accurately controlled washing of a full range of sizes from 8" to $\frac{1}{2}$ ".

TWO-COMPARTMENT DRUM — for efficient cleaning of coal with middling content requiring two-gravity, three-product separation.

CONE - for economical production of coal up to 4" in size.

Write for Bulletin M-3-M-4 containing further information on Mobil-Mill applications to east cleaning problems.

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JOY SUPER 14-BU LOADER



Performance—coupled with unrivaled simplicity of design and durability in service—made the 14-BU the world's most widely used loader in medium-low coal. Now, in the SUPER 14-BU, performance has been

stepped up even higher . . . the machine can get in and out faster, load more coal and stay on the job better than ever before.

For example, horsepower is increased from 40 to 65 HP. Peak loading capacity is stepped up 20%, and the high tramming speed almost 50%. All mechanical and electrical components have been beefed up to match the oversize horsepower motor, and reduce maintenance costs. The conveyor chain speed is in-

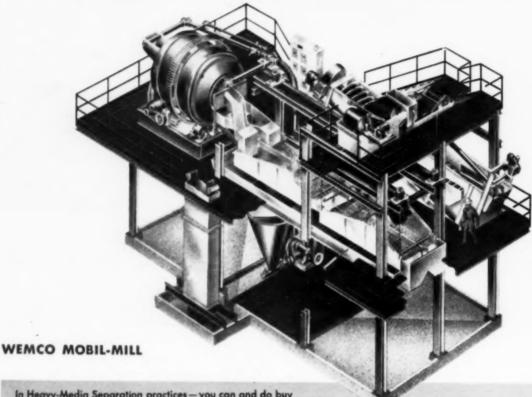
creased to more than 300 FPM—up about 30%—and the chain itself has 45% greater tensile strength. The loader actually weighs about 900 lbs. more, but heights are unchanged at 30½", 33" and 36".

Add extra advantages like those to Joy's famous gathering mechanism and exclusive Magnetax control—features that have been field-proved in every coal mining area in the world—and you have the kind of easy-operating, heavy duty, high production loader that means increased tonnage and reduced costs for you. • Let us show you what SUPER 14-BU Loaders or other Joy Mechanized Equipment can do to improve your profit margin! Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

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Consult a goy Engineer

have you ever wanted to buy "experience"?



In Heavy-Media Separation practices—you can and do buy experience when you purchase a Wemco Mobil-Mill. This prefabricated, built-to-order HMS plant offers a modern, highly economical method for precision coal cleaning. Behind every Mobil-Mill unit lies Wemco's extensive experience and leadership in HMS equipment manufacture. Attesting to this leadership is the fact that of all HMS plants in the world today, more than 50% are Wemco Mobil Mills.

WEMCO EXPERIENCE RESULTS IN THESE MOBIL-MILL ADVANTAGES

EFFICIENT CLEANING — accurate, consistent separations with high yield over a wide range of sizes and grades.

PREFASRICATED—for quick, low-cost field assembly in minimum time by Wemco or your own crews; easily dismantled and relocated.

FLEXIBLE DESIGN — engineered with a choice of components in combinations to suit individual coal washing characteristics.

MINIMUM FIRST COST—comparatively small capital investment per ton of washed coal.

LOW OPERATING COSTS — total costs average as low as 8c to 12c per ton of washer feed.

A Mobil-Mill Size and Model for Every Need

- · Plants designed to handle any tonnage.
- · Built to order for your job.
- Choice of 3 types of separators:

SINGLE DRUM — for accurately controlled washing of a full range of sizes from 8" to $\frac{1}{4}$ ".

TWO-COMPARTMENT DRUM — for efficient cleaning of coal with middling content requiring two-gravity, three-product separation.

CONE - for economical production of coal up to 4" in size.

Write for Bulletin M-3-M-4 containing further information on Mobil-Mill applications to coal cleaning problems.



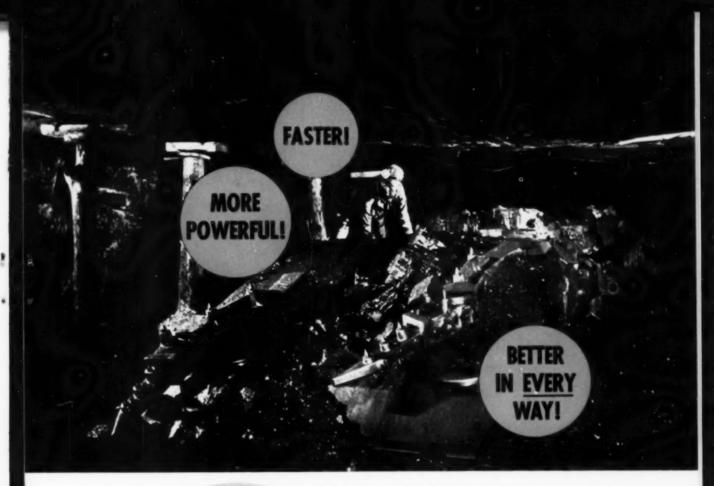
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JOY SUPER 14-BU LOADER



Performance—coupled with unrivaled simplicity of design and durability in service—made the 14-BU the world's most widely used loader in medium-low coal. Now, in the SUPER 14-BU, performance has been

stepped up even higher . . . the machine can get in and out faster, load more coal and stay on the job better than ever before.

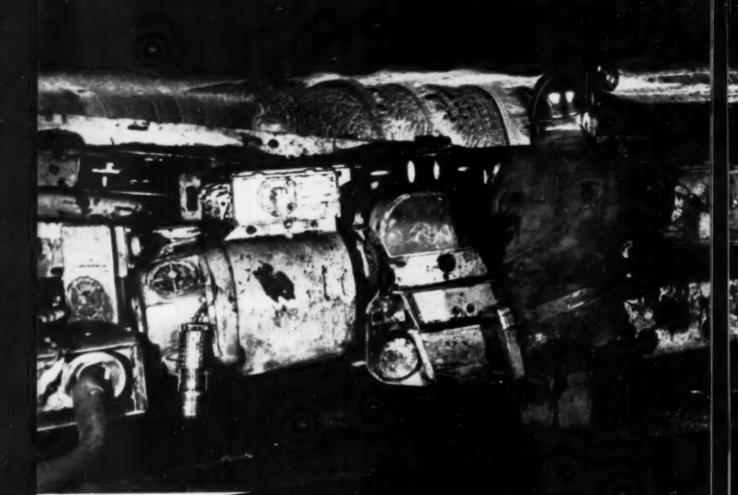
For example, horsepower is increased from 40 to 65 HP. Peak loading capacity is stepped up 20%, and the high tramming speed almost 50%. All mechanical and electrical components have been beefed up to match the oversize horsepower motor, and reduce maintenance costs. The conveyor chain speed is in-

creased to more than 300 FPM—up about 30%—and the chain itself has 45% greater tensile strength. The loader actually weighs about 900 lbs. more, but heights are unchanged at 30½", 33" and 36".

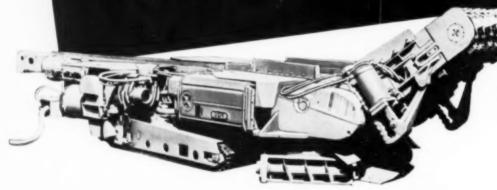
Add extra advantages like those to Joy's famous gathering mechanism and exclusive Magnetax control—features that have been field-proved in every coal mining area in the world—and you have the kind of easy-operating, heavy duty, high production loader that means increased tonnage and reduced costs for you. • Let us show you what SUPER 14-BU Loaders or other Joy Mechanized Equipment can do to improve your profit margin! Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

Consult a goy Engineer:



SCORE: 10 to 1



JOY 3-JCM

More than 230 Continuous Miners now on the job or on order

If you're looking for proof of the standout performance and efficiency of Joy Continuous Miners, that comparative score of 10 to 1 is your answer!

What it means is simply this: there are approximately 10 times as many JCM units now at work or on order as all other makes of comparable mining machines combined. That's field-proved superiority... not just a comparison on paper. What's more, it's proof from practically every coal-mining area in the world, and covers almost any mining condition you could name. You'll find JCM's in low coal, thick seams and split seams... developing entries,

opening headings, driving up rooms and taking pillar. They go anywhere . . . do every job well!

Look at it this way: Joy Continuous Miners are the modern way to protect your profit margin. They're fast, tough and flexible . . . built to give you maximum total recovery and high production rates at the lowest possible cost per ton.

• Joy engineers are always at your service. Let us help with your production problems, whatever they may be. Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Penna. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

Consult a Doy Engineer



WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT



Can't beat it for speed and flexibility in medium-low coal

In its field, this newest-model Joy 6-SC Shuttle Car is the best assurance of low-cost, high-capacity haulage you can get—and here's why.

First, it's field-proved as the fastest and most dependable car in its class. The 6-SC makes time where it counts . . . in continuous operation from the face to the discharge point and back again.

Second, this year's model includes many improvements, modifications and additions that greatly increase its serviceability and all-around efficiency. Motors, gearing, wheel units, brakes and frame are all over-capacity, and it has interchangeable wheels and non-slip drive, plus such Joy-pioneered features as power steering and airplane-type disc brakes.

The Joy 6-SC has 4-wheel positive drive, 4-wheel hydraulic steering, and hydraulically adjustable elevating discharge. It is built in five heights from 29" to 38½" without sideboards, with a capacity range from 100 to 180 cu. ft.

 Other Joy Shuttle Cars include a type for every mining condition. Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.





WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

Have you seen ... have you tried

BOWDIL'S NEW 1-29 CONCAVE BIT?

The concave shape stays sharp as it wears away. That means:

- 1. Easier cutting
- Faster cutting
- Coarser cuttings More profitable stoker Less bug-dust

PATENT NUMBER 2.217.347

- 6. Less drag
- Less down time
- mining machines

, and the DOUBLE POINT DOUBLES YOUR SAVINGS!

GREATER CUTTING FACE

SPECIAL ALLOY TOOL STEEL

PATENTED CONCAVE SHAPE STAYS SHARPER LONGER

> HEAT TERATED TO HARDNESSES BEST SUITED TO YOUR CONDITIONS

SEE-TRY-the new 1-29 Bowdil Bit

The BOWDIL Company CANTON, OHIO

Have your representative see us.

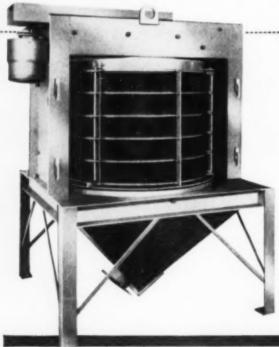
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These SYMONS "V" SCREEN advantages result in BETTER COAL PREPARATION AT LOWER COST...

- HIGH CAPACITY... made possible by new screening principle employing controlled diffused feed and vertical flow of material.
- MEETS WIDE RANGE OF SCREENING NEEDS . . . makes sharp separation of wet or dry materials in much finer meshes than conventional screens.
- EFFICIENT DEWATERING . . . low rotary speed and high speed gyratory action produces a much driver product.
- EFFICIENT DRY SCREENING . . . a natural "fanning" action carries the "air float" through with the undersize, making the handling of lightweight materials extremely effective.



● The Symons® "V" Screen effectively combines centrifugal and gravitational forces. This proven screen offers increased efficiency and economy in many phases of modern coal preparation service . . . including Sizing—Dedusting and Dewatering.

Requiring a minimum of floor space, the Symons "V" Screen is easily installed, and provides fully enclosed construction to assure dustless operation—yet access to the screen is simplified through easily removable covers. Mail the coupon for further details.

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Please send me further information on the following
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Want to cut your lubrication costs per ton of coal?



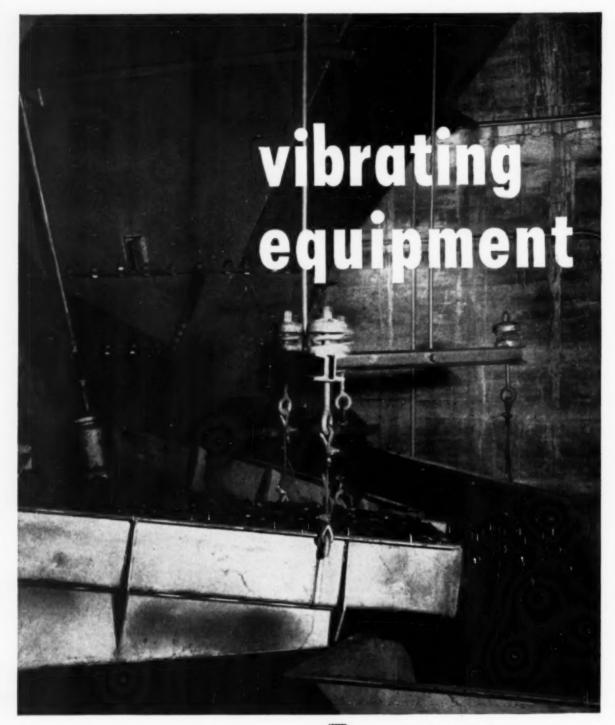
Get the help of an AMOCO mine lubrication engineer



The American Oil Company has a special staff of expert mine lubrication engineers to help you solve your lubrication problems. One of them will gladly make a lubrication survey for you at no cost to you. His aim will be to simplify the number of lubricants you need, and to reduce your maintenance costs. He will give your mine machinery better lubrication with such famous Amoco products as Paramo Oils, Amolite Oils, Amoco Leaded Lubricants, and Amerilube Greases. Call the nearest Amoco Office.

AMOCO LUBRICANTS

AMERICAN OIL COMPANY . FROM MAINE TO FLORIDA





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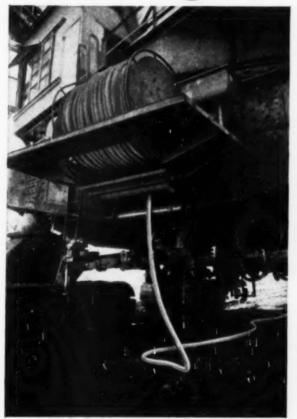
IF IT'S MINED, PROCESSED OR MOVED
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PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

U. S. Royal Cables are

Tough!



 U. S. Royal Cords and Cables must undergo half a dozen tough tests—to make sure they can stand up under the rigorous demands of modern mining. That is why a U. S. Royal Cable is always reliable.

United States Rubber Company is the only wire and cable producer to grow its own natural rubber, to make its own synthetic rubber and its own plastics. "U.S." controls the quality of its product at every step of its growth and manufacture.





Trailing Cables are often subjected to severe twisting in operation. To make sure that U. S. Royal Cables can take it, they are subjected to a combined twist-bend test. In this test a 42-inch length of cable is twisted radially 90 degrees in one direction, untwisted and twisted 90 degrees in the opposite direction. While being subjected to this 180-degree twist test and while supporting a 50-lb. weight, the cable is repeatedly bent over a sheave having a diameter approximately 3 times the diameter of the cable. Most U. S. Royal Cords and Cables are required to withstand 3,000 of the above twist-bend cycles before failure.



 Write to address below for free booklet, "U. S. Electrical Wires and Cables," which describes the complete line for the mining industry.

UNITED STATES RUBBER COMPANY

Electrical Wire and Cable Department

Mine Roof Bolts

Republic Makes Two Types

For Vertical or Angle Bolting Depending on Strata Encountered

Republic Roof Bolts contain all the features of the Upson Quality Line of headed and threaded products. Shanks are sturdy and tough...threads are clean, sharp and accurate ...heads are square-faced for snug wrenching.

Shank lengths are available in sizes from 18 inches to 90 inches with slotted or threaded ends...special lengths on request. Write us for additional information on Republic Roof Bolts.

REPUBLIC SLOTTED ROOF ROD—A one-inch rolled-thread rod with slotted end to take wedge. Furnished with hex or square nuts and various size roof plates. REPUBLIC ROOF BOLT —
A %-inch rolled-thread bolt with square-head and forged washer for additional bearing surface. May be used in combination with roof channels, roof ties, roof plates or angle washers.





Export Department: Chrysler Building, New York 17, N. Y.



Other Republic Products Include Machine, Tank and Carriage Bolts . Lag and Cap Screws . Track Bolts and Spikes . Pipe, Sheets and Wire



The GOODMAN Type 2600 MINER

Here's how it works:

The Goodman Miner attacks the solid coal face with a 42"-wide, rotating, cylindrical head bristling with cutting bits and wedges. It sumps into the coal to a depth of 18 inches at the top of the seam and cuts downward. As fast as the mined coal is knocked down, it is picked up by the gathering head and conveyed back to the discharge end.

To complete a single cutting cycle takes an average of only 30 seconds. The average amount of coal cut and loaded out during this time is one ton. Swinging head and tail motion permits a mineable working width of 17 feet without maneuvering the machine on its treads. Crosscuts can be turned at right angles to room or entry.



There's much more to tell about our new "2600" Continuous Miner—information that can make money, save money for you. Your inquiry is invited without obligation on your part.

Cutting Machines

Conveyors

Loaders

Shuttle Cars

Locomotives

Continuous Miners

YOU GET A

OF DUMPTOR STRENGTH

FOR EVERY TON







en you're loading 1/2 to 21/2 yards of rock at a pass, your hauling units need plenty of strength to last. With Koehring heavy-duty Dumptor, there's more than a ton of net vehicle weight for every ton of payload capacity. Sides, ends and bottom of all-welded body are heavily-reinforced with 5 and 8" channel ribs. Double-strength multiple rib-reinforced bottom cushions shocks of rock loading. Stationary or free-swinging kick-out pan adds another 1/2" steel plate to Dumptor bottom for extra protection.

There's plenty of strength, too, in the Dumptor chassis to take the constant pounding of heavy loading and rough off-road hauling. Rigidlytrussed 8" ship channels make up the main frame. 4" heat treated alloy steel drive axles are protected by one-piece cast-steel housing. "I"-beam steering axle is cast alloy steel. There are no leaf springs - just one big, double-coil chassis spring on the steering axle - none on drive axle. Big drive tires eliminate the need for more springs absorb loading and hauling shocks, save spring maintenance.

Even with all this heavy-duty construction, Koehring Dumptor has over 6 HP per ton of loaded weight - accelerates fast, pulls through soft ground and up grades with less shifting - climbs 24% grades fully loaded. See what these Dumptor advantages can mean in more work-time, less down time on your jobs. Call Koehring distributor for full details, or send for catalog.

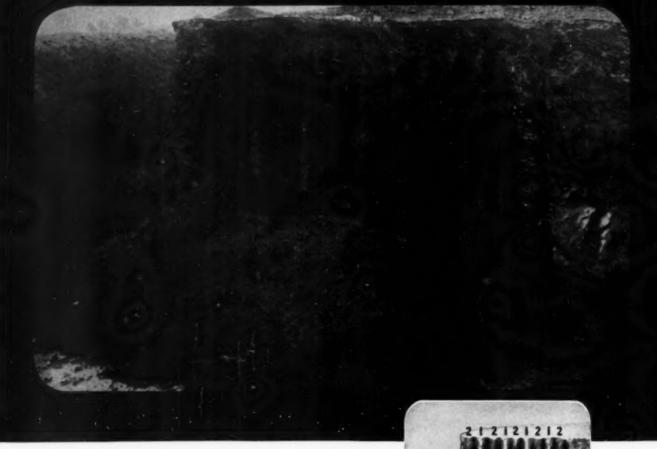
KOEHRING Company

40 Wisconsin



Subsidiaries: JOHNSON PARSONS . KWIK-MIX

Here's the secret of alternate ROCKMASTER teamed with alternate velocity loading





Alternate Velocity Loading is a newly introduced ROCKMASTER development which has produced astounding improvements in breakage and holds great promise for better blasting in mining, quarrying and construction work.

Every other hole is loaded with low velocity explosives. The balance are

loaded with high velocity explosives. The faster ROCKMASTER millisecond delay caps fire the low velocity holes to stress the rock and the next delay interval releases the sharp second punch of the high velocity explosive.

The results of alternate velocity action can be seen in the photo above. The number one holes (which appear larger and lighter colored) were loaded with low velocity Apex and fired with No. 1 ROCKMASTER caps. The number two holes (which appear smaller and darker) were loaded with high velocity Apex and fired with No. 2 ROCKMASTERS.

All holes were initiated from the bottom to prolong confinement of the blast—giving maximum results of the alternate velocity loading.

At present Alternate Velocity Loading is being used only in quarry blasting, but it holds possibilities in many other fields. Talk with your Atlas representative about it. And send for your copy of the new Atlas periodical "Better Blasting" which details the inside story of Alternate Velocity Loading.



Absolutely no secondary breaking was necessary on this Alternate Velocity Shot. No. 1 holes show that explosive has worked longer on the burden than the high celocity explosive in the No. 2 holes.



ATLAS EXPLOSIVES

"Everything for Blasting"

ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE Offices in principal cities



obile mining equipment demands more stamina from a portable cable than almost any other service. Cables attached to these underground mining machines are dragged over rough edges of coal and yanked around the sharp corners of pillars and entries. Only a long-life, cured-in-lead cable like TIREX has the stamina to resist the abrasion, tension strains and general rough usage encountered in this service.

Simplex-TIREX Cables are used as original equipment by many mining machine manufacturers because of the freedom from cable failure. That's just about the finest testimonial a product can get.

If you expect quality, economy and dependability from the cables you use, then be sure they are marked "Simplex-TIREX." They slash maintenance and postpone the day of cable replacement.

More complete information may be obtained from your nearest Simplex distributor or by writing to the address below.

WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 Sidney St., Cambridge, Mass.



Saves on Tire-Bruising Hauls!

The rougher your hauling jobs, the more you need the Con-Trak-Tor! It's built to take punishment—with triple-impact protection: extra rubber between plies, double shock-

pads, rock-resister cap plies. It's built to deliver traction—with exclusive full-lug design. Mount it—and save from that day on!

Also available in All-Nylon for heaviest duty

Get Full Proof—Phone your U. S. ROYAL Dealer Now!



Specialized by U. S. ROYAL to do your jobs better!

U. S. ROYAL FLEETMASTER

Smooth rolling on the road, superior traction off. 70% more tread depth! U. S. ROYAL ROAD TRACTION

New steering ease where most hauling is onroad at reasonable speed. U. S. ROYAL LUG TRACTION

Best for high traction at low speeds off the road or on unimproved roads.

U. S. ROYAL TIRES Product of UNITED STATES RUBBER COMPANY

ILLAS

at work...cutting costs!



Progress doesn't come by standing still! And many users of P&H Electric Shovels have learned (to their great benefit) of the strides made to cut costs in all kinds of open pit work. How has P&H done it? Higher electrical efficiency results from equipment designed and built by P&H specifically for electric digging. Stepless power regulation gives smoother operation with none of the old contactor troubles. P&H Magnetorque* Hoist Drive gives you snappier dipper actionlasts the life of the machine. Air-filtered cab protects all electrical equipment. Independent propel permits faster move-ups. All-welded construction of rolled alloy steels provides the husky strength to withstand years of continuous shock loads.

These and many other advancements, still exclusive with P&H, mean steadier, faster digging. That, in the final P&H, mean steadier, faster digging. analysis, means lower tonnage costs. If that's what you're looking for . . . P&H is your answer.

*T. M. of Harnischfeger Corporation for electro-magnetic type coupling.

PAH LARGE EXCAVATOR DIVISION

HARNISCHFEGER CORPORATION

MILWAUKEE 46. WISCONSIN





















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Engineering

VALUABLE IN INTERPRETING INCREASED OPERATING PLANS INTO EFFICIENT RESULTS

Your progressive coal production plans and requirements receive specialized engineering. In no case does a previous project become a model for the design and construction of any new assignment—except in the time-tested A&G fundamental engineering.

The services of A&G begin first with thorough consultation with your organization on every detail involving your present or planned operation. Next there is careful and complete study by our experts on all phases of your problems. Our report to you, which follows this study, provides amply for the present and fully anticipates the future.

In no case do we ever sell a "packaged unit."

We are an engineering organization exclusively, with no machinery to sell. We do make equipment recommendations because of our experience and purchases are made from various sources accordingly.

A choice of one of two fee plans is available — both being in your favor. One is a flat fee determined at the time of our estimate. The other is one where we go along with you on a small percentage basis figured on the final cost of the project. If the costs are lower or higher than the original estimate, our percentage fee naturally varies accordingly.

We will contact you at any time that you are ready.

SCOPE OF SERVICES

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- management of mines.
- Below ground modernization and mechanization.
- · Reconstruction, revemping,
- or improvement of existing
- General consulting work regarding power, equipment, operation, and various mining problems.
- Valuations for financing, fire loss, taxation purposereports and appraisals.
- We work with undivided responsibility to you on a cost and fixed fee besis.

We are not hampered by any connections which might prejudice the true professional engineering approach to your problem.

ALLEN & GARCIA COMPANY

Consulting and Construction Engineers

332 S. MICHIGAN AVE., CHICAGO 4, ILL. • 120 WALL ST., NEW YORK 5, N. Y.



Cold Test

Exposure to sub-Arctic temperature is one of the ordeals these cables must undergo to prove their qualifications. The cables are conditioned for one week at -70° F. and, while at this temperature, bent around a mandrel having a diameter three times that of the cable for cables .55" and less in diameter. Larger cables are bent to greater diameters. This is one of the most severe ways of testing U.S. Royals.



7 reasons why U. S. Royal Cables mean safety:

Seven grueling laboratory tests, each of them tougher than actual conditions, guarantee U.S. Royal's resistance to moisture, abrasion, cutting, heat, cold, impact, flexing. United States Rubber engineers spare no effort in making sure U. S. Royal is a completely safe electrical cable. Write for your free copy of valuable booklet on mining cables to address below.



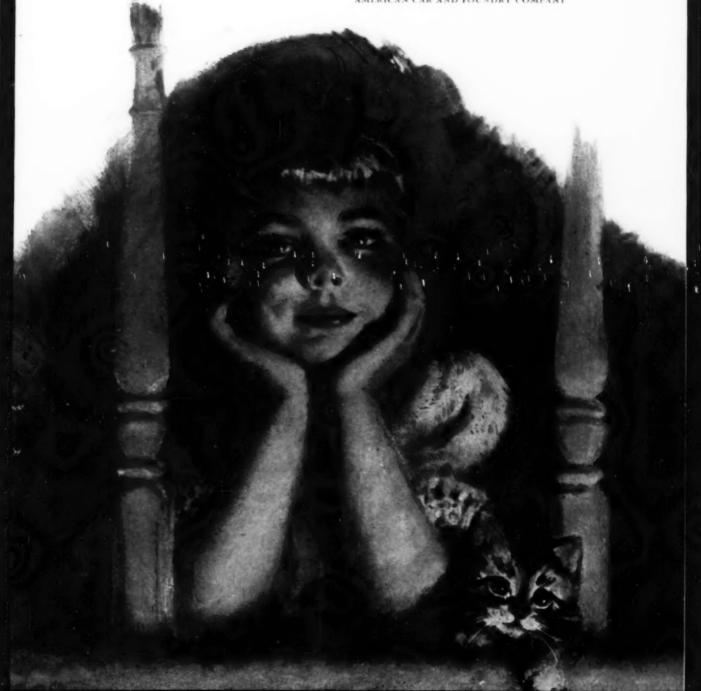
ELECTRICAL WIRE AND CABLE DEPARTMENT . ROCKEFELLER CENTER, NEW YORK 20, NEW YORK

and a little child shall lead them

The true spirit of this glorious Christmas Season is revealed in the natural joy and simple faith of little children.

In the midst of rejoicing and reunion let us join with them to light the way to better fellowship and understanding among all men.

AMERICAN CAR AND FOUNDRY COMPANY



A GOOD BENDER IS A"MUST" - BUT A PERFECT JOB DEPENDS ON



N a radiant heating job, it's a pleasure to work with Youngstown pipe. It bends readily to a true arc without flattening. That's because it is uniformly soft and ductile, and soundly welded in manufacture by the Youngstown continuous-weld process. The name "Youngstown", rolled into every length, is your assurance that it's GOOD PIPE.

YOUNGSTOWN STEEL PIPE

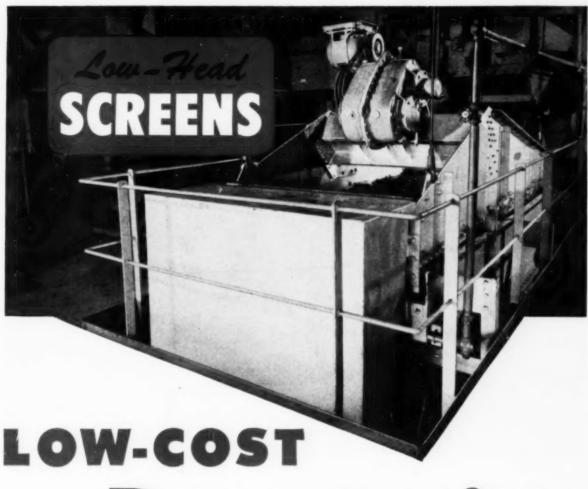
- · uniform ductility
- · uniform lengths
- · uniform threading
- · uniform weldability
- uniform wall thickness and size
- uniform strength and toughness
- uniform roundness and straightness

Youngstown

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of

General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y. Sheets - Strip - Plates - Standard Pipe - Line Pipe - Oil Country Tubular Goods - Conduit and Emt - Mechanical Tubing - Cold Finished Bars - hot rolled Bars - Bar Shapes - Wire - Hot Rolled Bods - Coke tin Plate - Electrolytic Tin Plate - Railroad Track Spikes



Dewatering

Dittsburgh coal company's Mathies Mine preparation plant is using

PITTSBURGH COAL COMPANY'S Mathies Mine preparation plant is using three 5x14 ft single deck Low-Head screens for secondary dewatering of 1½ x ¾ washed stoker coal. Production can be varied from 160 to 270 tons per hour without appreciable change in dewatering.

The horizontal operation of these screens, together with their unique straight-line motion and built-in dewatering dams, creates the necessary voids in the coal bed to obtain free drainage for light or heavy loads.

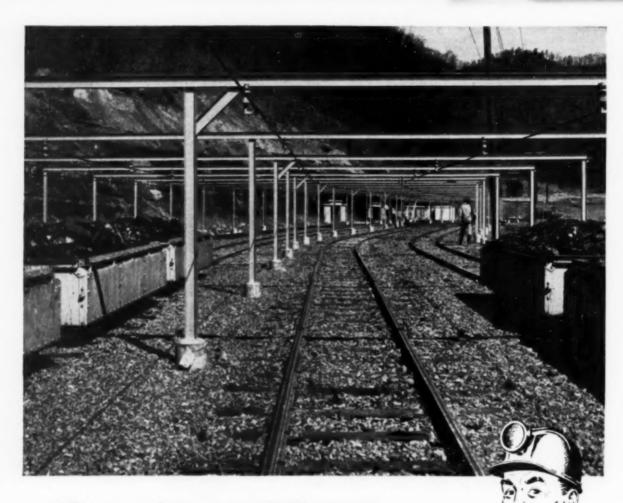
The simple design and rugged construction of these screens pay off in low operating costs and uninterrupted performance — the reasons for low dewatering costs in any modern cleaning plant.

In addition to dewatering, this plant is using Allis-Chalmers screens for sizing raw coal and desanding refuse. No matter what your screening problems, it will pay you to get in touch with the A-C representative in your area. Call him, or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 25B6280D.

ALLIS-CHALMERS

BUILDS FOR COAL PROGRESS





The coal "goes Pullman" on track like this

When you first glance at this picture, you almost get the impression you're looking at a Class I trunk railroad line. Notice the heavy rail, the heavily ballasted ties, straight-as-an-arrow tangents and smooth easement curves. Yes, coal gets a first class ride here!

This track happens to be part of a large, complex system in West Virginia. But it has one thing in common with many others throughout the mining industry: It's a Bethlehem prefabricated layout. And that means a lot to the success of any mine haulage system.

It means that Bethlehem engineers of long experience with mine-track problems design the layout to meet the needs of the individual mine. It means rails pre-cut precisely to length, curves formed to exact radii, ties spaced correctly to support the traffic they'll be required to bear. It means turnouts and crossings fabricated and assembled in Bethlehem's shops to be sure of an exact fit at the mine location. Every detail comes into the act, to the last tie-plate and splice bar.

If you think the time is right for revamping or enlarging your haulage system, invite our engineers in to help you plan it. You'll find that's the most profitable way to get your coal moving to market.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bathlehem products are sold by Bathlehem Pacific Coast Steel Corporation. Export Distributor. Bethlehem Steel Export Corporation

BETHLEHEM PREFABRICATED TRACK





NON-EXPLOSIVE MINING METHOD

is the cheapest means known for face preparation

The picture above tells its own story!

It shows how the "gentler", heaving action of AIRDOX dislodges coal in firm, large lumps, ready for easier, lower-cost mechanical loading. Notice also the excellent condition of the roof structure and face.

Important as it is, this is just part of the savings effected with AIRDOX. In mine after mine, it has also been proven that . . .

- The actual cost of dislodging coal is less with AIRDOX in practically every case.
- AND, because AIRDOX produces less fines, it reduces cleaning costs.

Our engineers are ready to show you, with facts and figures, the economies you can expect with AIRDOX in your mine. WRITE AND WE'LL ARRANGE A FREE SURVEY.



This bank of AIRDOX Compressors provides high-pressure air for dislodging coal in a large mine. Air is distributed through the mine by easily installed tubing.

CARDOX CORPORATION . BELL BUILDING . CHICAGO 1, ILLINOIS

WAREHOUSES

Harper, West Virginia Phone: Beckley 4812 Benton, Illinois

Phone: Benton 8-3821 St. Clairesville, Ohio Phone: St. Clairesville 619

Library, Pennsylvania Phone: Library Colonial 3-6910

Camden-on-Gauley, W. Va. Phone: Camden-on-Gauley 2181 Evansville, Indiana 307 Northwest Fifth St. Phone: Evansville 2-8944

Pikeville, Kentucky Route 2, Box 99 Phone: Robinson Creek 5 Louisville, Colorado Phone: Louisville 234

Phone: Ottumwa 1900



Coal fines washed out of mine run coal in the cleaning plant represent a product worth saving both in quantity and quality.

Many companies in coal mining districts all over the country are finding that compliance with anti-pollution laws is actually going to return them a profit.

Eimco filters used in dewatering coal fines have been selected by most progressive companies because: (1) Eimco offers the only reliable, heavy-duty unit for the job that is simple and free of trouble making gadgets. (2) Eimco's will operate continuously with a minimum of attention. (3) Cakes on Eimco filters are smooth and uniformly dried over the entire surface. (4) More tonnage is filtered per square foot per hour. (5) Eimco discs and Agidisc occupy less floor space per foot of filter area. (6) Better filter bag life, and many other advantages.

Write for more information.

THE EIMCO CORPORATION

The World's Leading Manufacturer of Vacuum Filtration Equipment

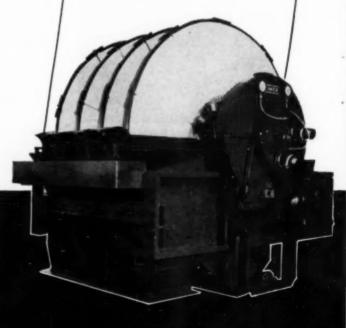
BRANCH SALES AND SERVICE OFFICES:

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IN FRANCE SOCIETE EIMCO, PARIS, FRANCE IN ENGLAND EIMCO GREAT BRITAIN LTD. LEEDS 12. ENGLAND IN ITALY EINCO ITALIA SPA. MILAN ITALY

Eimeo Agidise Filters for Dewatering Coal Fines

Highest production of salable product per ton of coal mined



when Overburden

squeezes the profits out of stripping . . .





CARDOX Surface AugerMiner teams up with mechanized loading for fast, lower-cost coal production.

Restores Abandoned Workings to Profitable Production

When excessive overburden puts a stop to conventional stripping, CARDOX Surface AugerMiners put mines back into profitable production. Drilling 100 to 120 feet, they salvage volume tonnage at a cost usually far less than for the original working. This "bonus" tonnage is easy to get.

CARDOX Surface AugerMiners are simply trucked or towed on their detachable wheels to the exposed surface. They are self positioning to the height of the seam. A rugged, 145 H.P. engine drives augers that drill holes up to 38 inches in diameter. AugerMiner coal is clean and free

of rock or shale - because directional control keeps the auger boring into the best part of the seam. Coal can be loaded mechanically into trucks without further processing. A built-in retriever makes it easy to add or remove the 6-foot auger sections.

If you have a seam where overburden has squeezed the profits out of conventional stripping, you may have abandoned your best paying tonnage! Investigate the CARDOX Surface AugerMiner. See your CARDOX Representative or write for AugerMiner Bulletin.

CARDOX CORPORATION . BELL BUILDING . CHICAGO 1, ILLINOIS

Harper, West Virginia Phone: Beckley 4812

Benton, Illinois

Phone: Benton 8-3821

St. Clairesville, Ohio Phone: St. Clairesville 619 Library, Pennsylvania

Box 427

Phone: Library Colonial 3-6910

Camden-on-Gauley, W. Va. Phone: Camden-on-Gauley 2181 Evansville, Indiana 307 Northwest Fifth St. Phone: Evansville 2-8944

Pikeville, Kentucky Route 2, Box 99 Phone: Robinson Creek 5 Louisville, Colorado Phone: Louisville 234

Ottumwa, lowe Phone: Ottumwa 1900

WAREHOUSES



Wire Rope at Work—On a slope installation like this, the wire rope seldom gets a breathing-spell. The rope shown here is unusually busy all day long as it sends cars, mining machinery, and supplies underground and hauls heavy loads up the steep slope to the surface.

The slope changes from 3 degrees in the yard to 16 degrees underground. At the knuckle, the rope is supported by five 20-in. cast-steel sheaves. To meet the three prime requirements of strength, abrasion-resistance, and flexibility, Bethlehem furnished a 6 x 19 Purple Strand rope with fiber core—a rope that is meeting every test without a whimper, in extremely heavy service.

BETHLEHEN

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel

Corporation. Expart Distributor: Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Betblehem rope for the following industries and numerous others:

MINING • CONSTRUCTION • PETROLEUM • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING

Gets men to job, stays on job

... on 16 TIMKEN® bearings

THIS mine car transposed sonnel to and from working commuters' special. The Irwin Foundry & Mine Car Co. makes sure of that by mounting the wheels on Timken® tapered roller bearings.

Tapered construction of Timken bearings takes thrust as well as radial loads-lets cars take curves easier without the need for extra

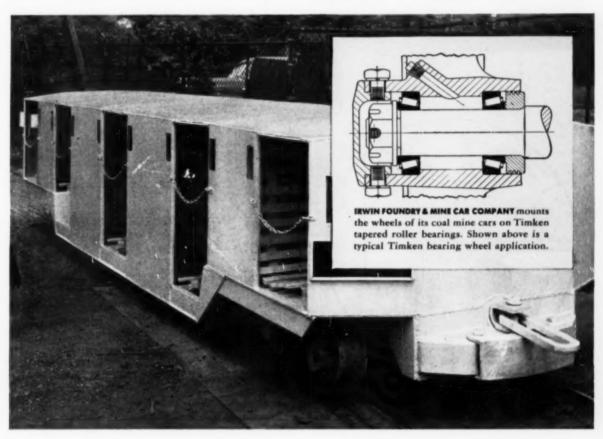
thrust plates or bearings. By holding hubs and axles concentric, Timken bearings make closures more effective. Lubricant stays in-dirt, coal dust and moisture stay out.

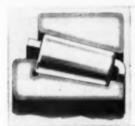
With Timken bearings on the wheels, inspection is simplified. Wheels can be easily removed for bearing inspection by simply pulling the cap, cotter pin and nut.

No other bearing gives you all the advantages you get with Timken bearings. Be sure the mine cars you buy are equipped with them. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



This symbol on a product means its bearings are the best.





HARD ON THE OUTSIDE, TOUGH ON THE INSIDE

Rollers and races of Timken bearings are case-carburized to give a hard, wear-resisting surface and a tough, shock-resisting core. Result: longer bearing life.

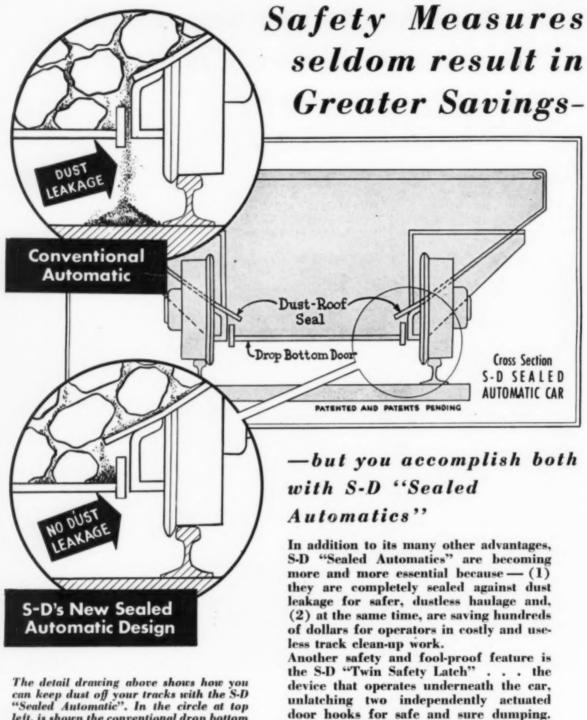
The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. spe-cial analysis Timken steels.

TAPERED ROLLER BEARINGS



NOT JUST A BALL O NOT JUST A ROLLER TO THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST BEARING TAKES





"Sealed Automatic". In the circle at top left, is shown the conventional drop bottom construction and how dust shakes down and out through the clearance space between the door and the car frame. In the lower circle you see how the new "Dust-Roof Seal" carries sifting dust across the open space, providing a 100% effective

dust seal.

SANFORD-DAY IRON WORKS, Knoxville 9, Tenn.

ever known.

Along with these important features you

still get the extra capacity and automatic

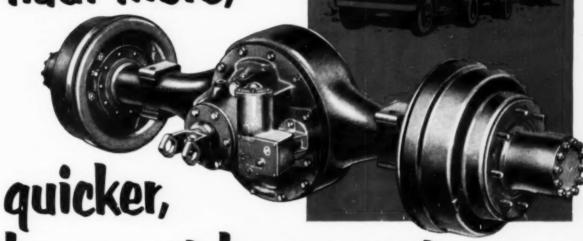
unloading of our cars. You still get our

improved long life construction. You get

the most efficient car the coal industry has

Performance Records prove Eaton 2-Speed

Axle trucks haul more,



longer, at lower cost, are worth more when

More than a million-and-a-half
Eaton 2-Speeds in trucks today!
For complete information, see your truck dealer.

traded-in

EATON

AXLE DIVISION

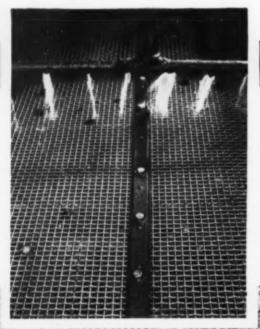
MANUFACTURING COMPANY

CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves Tappets Hydraulic Valve Lifters Valve Seat Inserts Jet Engine Parts Rotor Pumps Motor Truck Axles Permanent Mold Gray Iron Castings Heater Defroster Units Snap Rings Springtites Spring Washers Cold Drawn Steel Stampings Leaf and Coil Springs Dynamatic Drives, Brakes, Dynamometers

Short screen life was pushing operating costs up and up until this cleaning plant changed to Stainless Steel

S. Van

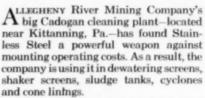


LEFT

This heavy-duty Stainless Steel screen is on a double-deck unit which takes out the ¾ x ½ x coal with the oversize going to the crusher.

BELOW

These Stainless Steel HUM-MER Electric Vibrating Screens are lasting five times as long as any other type in production of fine stoker coal – removing 3/4" x 5/4" x 0. All screens were fabricated by THE W. S. TYLER COMPANY, Cleveland, Ohio.



"We are getting 400% more life from our Stainless Steel screens than we previously got from ordinary screens," Chief Engineer J. S. Schrecengost points out. "This means we are saving between 20 and 25% on our labor costs, since most maintenance has to be done on overtime.

"The short life we were getting from common steel installations was running our operating costs dangerously high, but the use of Stainless Steel has greatly minimized this."

Highly important, too, is the question of downtime. When a key piece of equipment fails in this plant, 3000 tons of coal production are lost each day until operation is resumed, to say nothing of the cost of wages and replacement material.

Another advantage of Stainless Steel screens demonstrated in the Cadogan plant is the way they maintain hole size without wear and without blinding.

"Since we have changed over to Stainless Steel," Mr. Schrecengost says, "we have increased the life of screens, increased production, cut operating expenses, decreased downtime and we are getting much better sizing."

Stainless Steel equipment can do the same for your cleaning plant. Especially if it is perfected, service-tested U·S·S Stainless Steel.

UNITED STATES STEEL CORPORATION, PITTSBURGH . AMERICAN STEEL & WIRE DIVISION, CLEVELAND . COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
MATIONAL TUBE DIVISION, PITTSBURGH . TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. - UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, DEW YORK

U·S·S STAINLESS STEEL

SHEETS . STRIP . PLATES . BARS . BILLETS



PIPE - TUBES - WIRE - SPECIAL SECTIONS



We thought we'd catch your eye and give it a break at the same time!

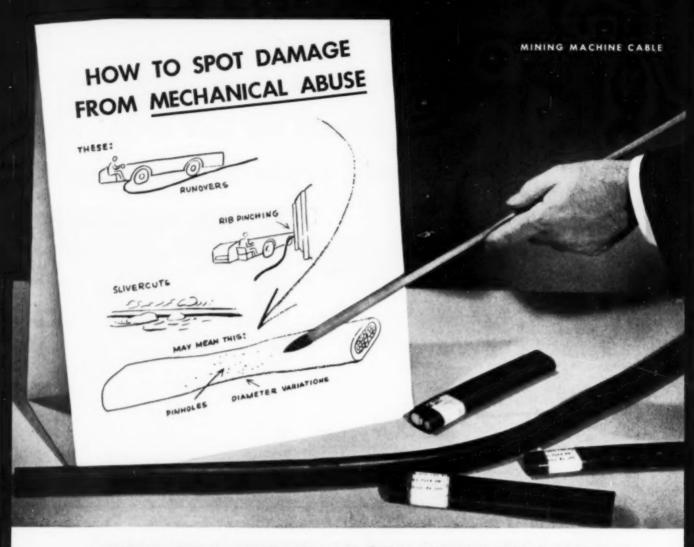
Most of you mining and quarry men undoubtedly follow, as we do, all of the top magazines in the field. You have to, in your business. We have to, in ours. And if you're anything like us you've probably gotten tired of seeing the same sort of pictures, page after page.

SO WE THOUGHT WE'D CATCH YOUR EYE, AND GIVE IT A BREAK AT THE SAME TIME by not showing any picture at all! As for selling you, we feel we can rely on the acceptance and popularity the great Cities Service name enjoys throughout the industry. ACCEPTANCE because our industrial oils and greases are as good as the best in every case, better in most! POPULAR because Cities Service Engineers have gone out of their way, time and

time again, to help solve tough lubricating problems successfully in hundreds of mining and quarry operations.

If you have a tough problem on your hands, call in our Lubrication Engineer for help . . . and take advantage of the tremendous research staff and laboratory facilities that back up every Cities Service Lubrication Engineer. Simply call or write your nearest Cities Service Office, or write Cities Service Oil Co., Dept. L5, Sixty Wall Tower, New York 5, New York.





... AND WHY THERE'S MUCH MORE TOUGHNESS IN ANACONDA'S NEW MINING MACHINE CABLE

Your naked eye can't spot diameter differences in new cables. That's why it's important to check promptly when you do see variations in cable after it's been used. It has probably been crushed... by runovers or rib-pinching. Compression cuts may let in moisture to shorten cable life.

HOW TOUGH SHOULD CABLE BE?

As tough as we can make it—regardless of cost. One break in a cheap cable costs more than you can save by buying on price. The new Anaconda Cables mean lower costs to you because they can take

much more abuse. In fifteen mines recently surveyed, the average life of ANACONDA Cables on shuttle cars jumped 300% over cables used only a few years ago.

WHY THE NEW ANACONDA CABLES LAST LONGER

A stronger jacket, made from a new neoprene compound, resists heat, flame and moisture better. In wet mines, sliver-cuts that may cause shocks are less likely to occur. A new cold-rubber insulation means new toughness. Moisturewise and puncture-wise both. A new type of stranding improves the flexibility of these cables under stress.

YOU BE THE JUDGE

Examine an Anaconda Cable. See why these things are so. Call your nearest Anaconda Sales Office or Distributor for a sample. And remember: no Anaconda Cable has ever failed a U. S. Bureau of Mines flame-test. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

ANACONDA

TODAY'S HEADQUARTERS FOR MINE CABLE

HAT TWIN CABLES FOR shuttle cars continuous miners loaders cutters dull trucks









BUCYRUS-ERIE Announces



the 180-W

WALKING DRAGLINE

Combining Big Output Capacity And Long Working Reach With Unusual Portability

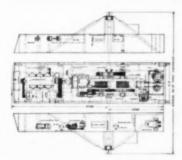
Diesel or Ward Leonard Electric

THIS NEW Model 180-W offers the operating features that have proved so successful in many years of actual field performance by the outstanding line of Bucyrus-Erie walking draglines. In addition, it offers exceptional shipping and erecting ease for a machine so large — only partial disassembly necessary for moving from one stripping job to another. This means substantial savings in moving time and expense, as well as increased machine value throughout its entire life.

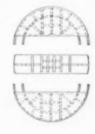
- Big output capacity from fast cycle, quick moves, steady all-weather performance.
- Long reach where needed with 5-yd. bucket the 180-W will move material 244 ft, in a 180 degree swing.
- Knocks down into large sections for easy moving and erecting.
- Easily maneuvered to most effective working position with Bucyrus-Erie's exclusive walking mechanism.
- Large bearing area permits working on soft ground.
- · Low maintenance with a minimum of moving parts.
- · Simple main machinery.
- All-welded boom with tubular braces for light weight, plenty of strength.

Send for complete information on the 180-W 5-yd, bucket with 120 ft, boom 4-yd, bucket with 135 ft, boom

BUCYRUS-ERIE COMPANY



For shipment the side wings unbolt from center section of revolving frame. The main machinery remains fully assembled and in proper alignment. The entire machine is easily loaded on five U.S. railroad cars.



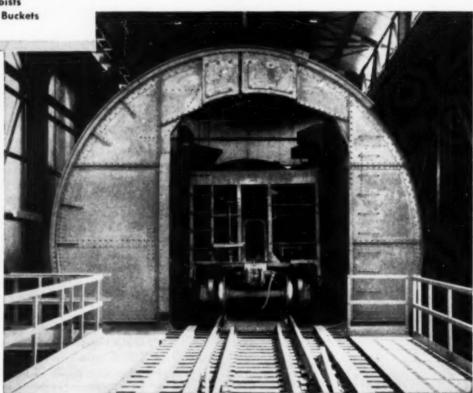
The base is made up of three separate welded-steel sections which are joined in the field by bolting flanges. It is easily disassembled and shipped.

Wellman will build it

Special Cranes
Car Dumpers
Gas Producer Plants
Ore Bridges
Charging Machines
Forging Manipulators
Gas Flue Systems
Gas Reversing Valves
Coke Pushers
Mine Hoists
Skip Hoists
Clamshell Buckets

Wellman car dumpers

...designed and built for years of dependable service



Wellman 60-ft., 4-clamp Revolving Car Dumper. A rack segment and pinion at each end of the frame turns each end equally, preventing distortion of the frame.

• The complete line of Wellman Car Dumpers includes Lifting, Turnover, Traveling and Revolving Types, the latter is shown above. It is self-contained, requiring no external structures. You can depend on Wellman equipment for many years of economical performance. It is backed by more than half a century of experience in engineering, manufacturing and construction.

THE WELLMAN ENGINEERING COMPANY

7000 CENTRAL AVENUE

CLEVELAND 4, OHIO

COMPTON Model 48 Coal Auger



Recovers coal up to 208 ft. from the pit wall

... regardless of overburden

The Compton Model 48 Coal Auger is designed to give you maximum efficiency at low cost. CHECK THESE FEATURES!

- 1.—Auger sections racked on frame—ready for transfer to operating position by hydraulically controlled synchronized winches in a matter of seconds.
- 2.—Hydraulically-operated pilot pan eliminates spillage between machine and high wall.
- 3.—Entire unit is self-contained including elevating conveyor.
- 4.—Hydraulically-controlled swivelling discharge turret chute permits uniform trimming of trucks.
- 5.—Hydraulic jack legs (with self-leveling pontoons for better floatation) permit drilling up to 208 feet without misalignment ... also permits drilling vertical overlapping holes for varying seam thickness.

COMPTON CUTTING HEAD

EXCLUSIVE WITH COMPTON AUGERS...
BUILT-IN SPIDER ASSEMBLY ON NON-CLOGGING HEAD RESULTS IN INCREASED PRODUCTION BY DRILLING STRAIGHTER HOLES
WITH LESS FRICTIONAL DRAG.

MODEL 48 SPECIFICATIONS

Length: 48 feet; Weight: Approx. 36 T.
Carries eight 26 feet auger sections.
Required pitwidth: 50 feet
Power: 300 HP Diesel Engine
Hydraulic frame jack lift: 66" or 120"
Auger diameters: 28" to 48"
Possible drilling depth: 208 feet

Consult a Compton Engineer for Details



BOX 1946 - PHONE 4-6384 CLARKSBURG, WEST VIRGINIA

Confidence...

A STATE OF MIND THAT GOES WITH

J&L WIRE ROPE

confidence in Quality

because J&L stands for:

- 1. Quality-tested steel wire
- 2. Uniform fabrication of strands
- 3. Wires and strands in perfect balance
- 4. Special lubrication of strands
- 5. Accurate construction (true to round)
- 6. Resistance to bending fatigue

CONFIDENCE IN SEIVICE

because you can depend upon J&L Distributors and Sales Offices for:

- 1. Quick, efficient delivery
- 2. Complete stocks near at hand
- 3. The right rope for every job
- 4. Technical service by





WHY EUCLID **SWITCHED TO COAL!**



"We cut costs and provided our expanding plant with a flexible heating system by burning coal instead of gas,"

> says D. L. Lawrence, Plant Engineer The Euclid Road Machinery Co. Cleveland, Ohio

"Upon expanding our St. Clair Plant, we found we could save money by replacing our gas-fired heating system with a modern coal-burning installation. After we er plant again doubled boilers shown alv all our

TO HELP SELL COAL ...

BCI Advertises to the Industrial, Commercial and Institutional Markets.

Each month, full-page messages like the one shown here-featuring either "off-track" or "on-track" installations-appear in the pages of Business Week, Nation's Business and a carefully selected group of power journals and trade magazines.

COAL

chanized world.

281.

The most stable of

COAL is the safest fuel to store and use.

COAL is the fuel that industry counts on more and is the tuer that industry counts on more and more—for with modern combustion and handmore—ror with modern combustion and hand-ling equipment, the inherent advantages of nng equipment, the innerent advantages well-prepared coal net even bigger savings.

And with bituminous coal, you will continue to enjoy these advantages for years and years.

can cut your labor costs and provide you with a

clean, convenient, dust-free operation.

What does it cost you to operate your steam plant

past few years, you could reduce that cost substantial

with modern, bituminous coal-burning equipment,

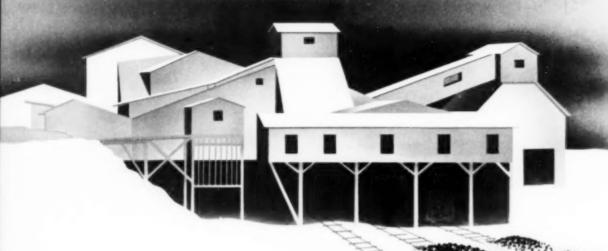
Modern combustion equipment can give you 10% to 40% more steam from a ton of coal. Up-to-date coal and ash handling equipment

Chances are that, unless you've modernized in the

BITUMINOUS COAL INSTITUTE

A Department of National Coal Association Southern Building, Washington 5, D. C.

FOR HIGH EFFICIENCY FOR LOW COST YOU CAN COUNT ON COAL!



THREE-PRODUCT HEAVY-MEDIA SEPARATION PLANT HELPS TURN MARGINAL MINE INTO PROFITABLE COKING-COAL PRODUCER

They worked the mine for fifty years...and then seam conditions changed. Extensive drilling and core-testing showed reserves of many million tons but future seam conditions widely variable. Reserves could be mined, but not marketed without efficient cleaning.

The Wise Coal and Coke Company turned adversity into opportunity . . . decided to concentrate on coal's most profitable markets...to produce furnace, foundry and chemical coke and to ship only very low-ash coal for steam-coal use. To keep costs down, the mine went

to full-seam mechanical mining. To keep quality and recovery up, a unique Heavy-Media Separation plant went in alongside the existing tipple.

The Problem and Its Solution

Heavy-liquid tests showed that a straight-line 1.40 separation of all + \frac{1}{4}" would produce desired 14,400 Btu coal with a 5% maximum ash, regardless of variations in r.o.m. But, due to variable partings in the seam, a 1.40 separation would reject appreciable coal adhered to bone and rock. Efficient middling

AMERICAN Cyanamid COMPANY

MINERAL DRESSING DIVISION

30 ROCKEFELLER PLAZA



NEW YORK 20, NEW YORK

recovery and re-treatment were the key to profitable operation. Carload tests at a nearby Heavy-Media Separation plant confirmed these conclusions . . . and the practicality of a proposed flow scheme.

Accordingly, the Wise Coal & Coke Company contracted for a Heavy-Media Separation plant using a two-compartment drum to produce three-products from $3x^{1}4''$ r.o.m. in one pass thru the separator. Raw feed is cleaned at 1.40 in the first compartment. Float coal overflowing a circular weir contains less than 5% ash . . . can be carbonized or shipped to premium markets. Sink (comprising middlings and true refuse) passes automatically to the second compartment where a 1.60 separation drops the refuse. Middlings are crushed to $\frac{1}{4}''$ and re-treated on tables along with $\frac{1}{4}''x0$ material screened out at the tipple. Working two shifts, this plant has a capacity of over 1300 tons daily with a high over-all efficiency. Details of the flow scheme, equipment and operating results on this difficult separation are given in the reprint offered below.

What They Did ... You Can Do

Why settle for less than maximum recovery of shipping coal when you build or re-build a cleaning plant? No matter how difficult the separation, no matter how the raw-feed fluctuates in tonnage, size-consist or percentage of near-gravity material, Heavy-Media Separation can closely duplicate heavy-liquid washability tests on your coal. No other process approximates the separating efficiency of true Heavy-Media Separation... no other process provides constant control, conditioning and recovery of the separating medium for maximum recovery of specification coal... no other process or equipment keeps your refuse so free from saleable coal!

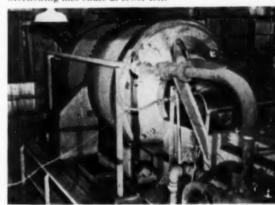
If you have not read the fact-filled paper presented at the 1953 American Mining Congress Coal Meeting by J. B. Taggart, Vice-President, Wise Coal & Coke Company, Dorchester, Va., we invite you to send for a reprint. It shows how one company is solving its profit-problem . . . how Heavy-Media Separation can help you operate more profitably, too.

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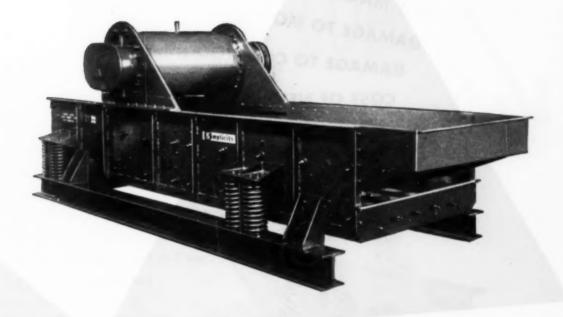
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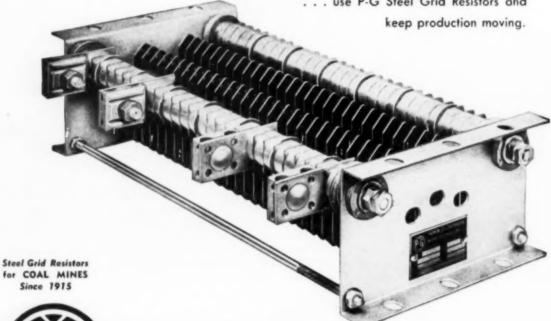
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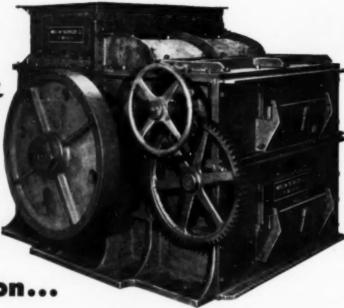
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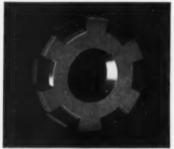
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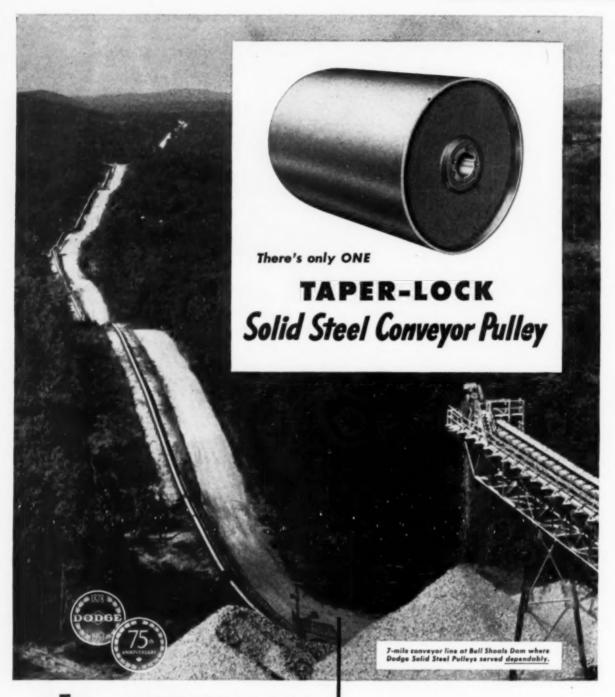


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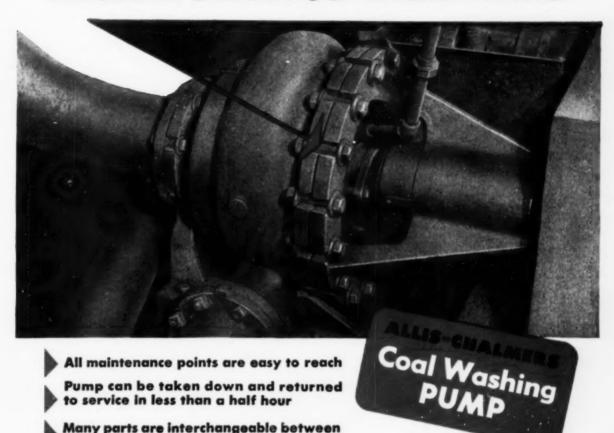
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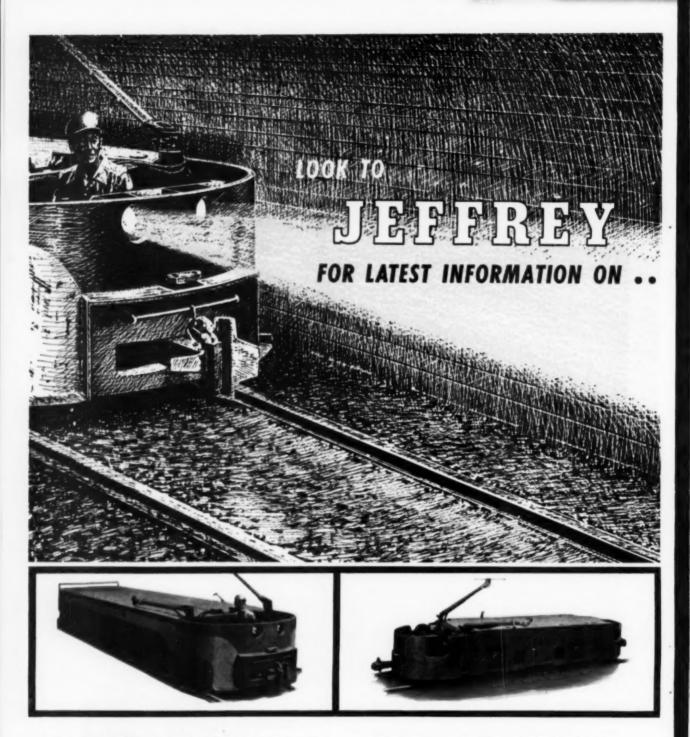
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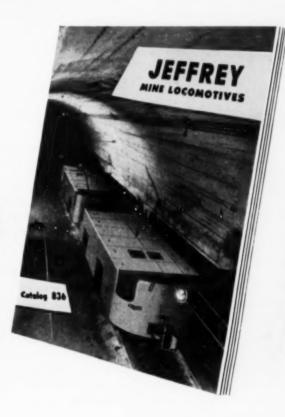
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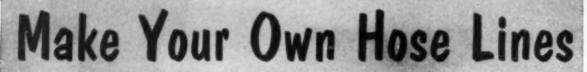
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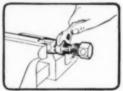
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The PROVED and APPROVED DETONATING FUSE

DECEMBER, 1953

IVAN A. GIVEN, EDITOR

Merchandising—For Profit

IT IS RELATIVELY RARE these days to find a product so unique, so much desired or so free from competition that selling it is unnecessary. Coal certainly is not one of these rarities and hasn't been for a long time, if ever. In fact, coal at the moment is subject to as stiff competition from the outside as at any time in history. What are its weapons? On the cost and quality side, it is fairly well armored, thanks to its two-billion expenditure in the past ten years for modern production and preparation facilities — and it still has real opportunities in these directions. But there is a growing conviction that its merchandising efforts have not kept pace with its efforts on the production and preparation sides.

Measuring the Market

Merchandising, or selling, is the process of convincing the prospective purchaser that the particular product being offered him provides the most in benefits for the money. Even before that, however, it is necessary to locate the prospect or, to put it another way, to make sure that you have the name and address of everybody who should be a user of what you have to sell. Here is where one of the first handicaps in merchandising coal today shows up. For example, Coal Age recently tried to find out what was happening and what the prospects were in the "Other Industrials" market, and found instead that coal men are not too certain about them either. The first step in merchandising is sizing up the market-in other words, finding out who the possible customers are and how much they might buy. Only then can selling be properly planned.

Manufacturing Sales

The process of manufacturing sales may be broken down into five steps: (1) making contact, or reaching all the men who directly or indirectly control buying; (2) arousing interest in the type

of product—in this instance, coal; (3) creating preference for the product; (4) making a specific proposal, meaning fitting the product to the prospect's needs; and (5) closing the order by the exercise of the necessary patience, resourcefulness, sales ability and time. Each of these steps is worthy of a book in itself, and neglect of any of them can prevent a meeting of minds between the seller and the buyer. And finally, beyond all of these, is the need for doing everything possible to keep the customer coming back for more.

Making the Start

Advertising, expert personal selling and service are the keys. Their development is no short or easy task, but the evidence indicates that coal is lagging in this direction and therefore is failing to cash in to the fullest on its opportunities. Where to start? Perhaps the best place is a critical look at present methods to see how they measure up to the standards commonly used by leading merchandisers. If the conclusion is that they could be improved, perhaps everything necessary could be done within the individual organization, or perhaps a greater degree of cooperative effort between groups of organizations would be required. In any event, study of the problem is the first and vital step.

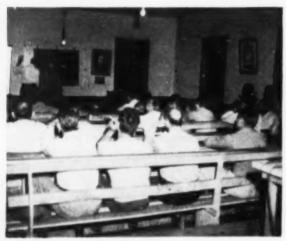
Cashing In

What can improved merchandising do? First, it can make sure that every possible prospect is uncovered. Second, it can make sure that every prospect gets the full story of coal's advantages. And selling coal's benefits rather than coal as coal can have the further and most-beneficial effect of easing the price strain. A better price is the inevitable result of a good merchandising job. That alone is worth a serious effort to strengthen this link in the coal chain.

How 100% Training Gives a Lift to Safety

				er Lost-	Frequen	cy Rate	Severity Rate		
Mine and Company	Number of Men Trained	Date Training Completed	Before Train- ing	Since Train- ing	Before Train- ing	Since Train- ing	Before Train- ing	Since Train- ing	
Virginia Lec mine, Virginia Lee Coal Co.* Inland Steel Co., mines, plant and offices,	75	▶ Aug., 1952	14,0001	52,000		****			
Wheelwright, Ky	1.361	Nov., 1952			21.161	6.672	10.31	0.26^{2}	
No. 1 mine, Princess Elkhorn Coal Co	275	Dec., 1952	34.293	88,758	41.23	13.64	3.69	1.25	
No. 2 mine, Princess Elkhorn Coal Co	180	Dec., 1952	26,127	117,127 ³ 57,265 ²	29.82	8.15 ³ 19.56 ²	2.71	0.21^3 0.12^2	
Keen Mountain mine, Red Jacket Coal Corp.	546	Feb., 1953			31.71	23 484	9.69	1.794	
Consolidation Coal Co. (Ky.) mines, plant and									
shop, Jenkins, Ky	1,076	Apr., 1953	12,068	157,1536	45.80	5.60			
Stonega Coke & Coal Co., Big Stone Gap, Va.	Classes	continuing	15,021	34,477					
Crossbrook mine ⁸	66	May, 1953		21,1287					
Derby mine*	345	Aug., 1953	15,284	33,8907					
Roda No. 5 mine*	-	continuing	23,905	29,7307		17.17			

Whole year, 1951.
 First 7 mo, 1953.
 Whole year, 1952.
 March-Sept., 1953.
 Whole year, 1949.
 First 4 mo, 1953.
 August, 1953.
 New mine, 1953.
 Source: Norton Branch U. S. Bureau of Mines.
 No lost-time accidents since training.



2:11 P.M.-CLASS UNDER WAY 11 min at Roda mine. Miners are alert, attentive to Instructors Yanity and Cress.



2:42 P.M.-NO LET-UP in miners' interest. Men sit forward on edge of seats, hear pointers on barricading.

Down-to-Earth Teaching Keeps Interest High, Gets Safety Results

give rapt attention as instructor stresses day's lessons.

3:23 P.M. END OF SESSION NEARS but men still INTEREST BUILDERS-Instructors Cress (left) and Yanity are experienced mining men, know miners.





Swinging miners 100% behind safety is a sticky problem for coal companies. But with help from the union and two USBM sparkplugs, 13 neighbor companies in Virginia and Kentucky have found how to do it. This is the story of how they achieved . . .



EVERYBODY COUNTS in safety. Here, in an office of Inland Steel Co., accident-prevention training and its results get a review by Arville Adkins (left), safety committeeman, and Scott Wallen, president, UMWA Local Union 5899; Arthur Bradbury, Inland's safety director; J. B. Yanity, USBM; Mack Rollins, local-union treasurer; F. A. Cress, USBM; and Olney Collins, one of Inland's mine inspectors.

100% Training: Big Lift for Safety

"ACCIDENT - PREVENTION TRAINING FOR 100% of our men is the best thing that ever happened to us down here."

"If we decided to bring the course in here again, our men still would attend 100%, like they did the first time. Only next time, we wouldn't have to push any of them to get them to come to the classes. They'd come because they want to."

Those are the words of two miners who are officials of their local unions in eastern Kentucky and southwestern Virginia. They are stating their feeling about 100% training of miners and operating officials in the 20-hr accident-prevention course taught by two instructors from the Norton, Va., branch of the U.S. Bureau of Mines.

Since January, 1949, 100% of the workers in 19 mines, two preparation plants and one big shop of 13 companies in that area have taken the course. The total is nearly 5,500 men. Besides miners and other contract employees, all mine officials of all 13 companies, all clerical and office workers (including women) of at least one company, and nine officials of the Pikeville, Ky., subdistrict of UMWA District 30 have gone through the course.

The results of this 100% training now are showing up in the safety records of the companies involved.

For example, take the coal operations of Inland Steel Co., Wheelwright, Ky. In 1951, the accident record of that company showed two fatal and 53 non-fatal accidents, with a frequency rate of 21.16 and a severity rate of 10.31. That was far better than the national average but not good enough to satisfy Inland officials. So, in August, 1952, the company asked Bureau of Mines instructors to come in and conduct their accident-prevention course for all workers and officials. Even employees in the stores and offices joined in. By mid-November, the training was complete-100% throughout the company, including E. R. Price. Inland's top coal official. Then, to nail everything down, the company asked for a special course for coal-mine officials, with major stress on the Federal Coal Mine Safety Law. About 80 supervisors took this course. The result: at the end of the first 7 mo of 1953, Inland Steel Co's, record showed no fatal accidents to date, only eight non-fatal accidents, a frequency rate of 6.67 and a severity rate of 0.26.

For another example, take three mines of Stonega Coke & Coal Co., near Big Stone Gap, Va. All the men and supervisors at Crossbrook and Derby mines completed training at mid-year, 1953. The men at Roda still were taking instruction in Sep-

tember and by now doubtless have finished. Now look at the record. In the whole of 1952, the company's mines produced 15,021 tons per accident, with one fatality and 156 other accidents. But in August, 1953, the mines produced 34,477 tons per accident, with no fatalities in the month (in fact, none in the first 8 mo of 1953) and only four lost-time accidents.

Improvements in safety at mines of Consolidation Coal Co. (Ky.) already are on the record (Coal Age, July, 1953, p. 101). Much of this improvement, according to M. E. Prunty. Consol's safety director, is the result of 100% accident-prevention training.

These are typical results in companies where miners, surface workers and mine officials have gone all-out for the Bureau's course.

The big question is: What makes miners go along 100%?

From observation and experience, the following factors emerge as "musts" in a successful program:

- 1. Management convinced 100% of the need for safety and of its benefits.
- 2. Local and district union officials 100% committed to support.
- 3. Persuasion and reason displacing the "command" approach to miners.
- Supervisors and other officials attending classes with miners.



REWARD FOR ACHIEVEMENT—Bart Bloomer (left foreground), safety director, UMWA District 30, hands UMWA scroll to Scott Wallen, president, UMWA Local No. 5899, as Mack Rollins, James H. Ricker and Charles Rollins, other officials of local union, look on.



BUREAU RECOGNITION—Each miner who completes accident-prevention training is given a certificate and pocket card by U. S. Bureau of Mines.

Subject matter geared to the experience and needs of miners.

Teachers steeped in coal-mining know-how and skilled in meeting the miner on his own ground.

7. The convenience of miners recognized and met.

8. Recognition bestowed for achievement.

HOW TO GET TRAINING STARTED

With two Bureau of Mines instructors, F. A. Cress and J. B. Yanity, sharing the joint role of sparkplug and teacher, here's how the 100% training goal is being reached in southwestern Virginia and eastern Kentucky:

Somebody builds up the case for accident-prevention training and sells it to top management. Most often, Mr. Yanity and Mr. Cress are the chief builder-uppers. But it may be somebody within the company—the president, the safety director or a superintendent—who starts things going. Or it may be somebody from the outside—a union official, for example.

Selling top management on safety usually is no job at all, because coal-

mining men everywhere already are convinced that the only good mine is a safe mine. But sometimes it is hard to sell the accident-prevention course, and especially hard to sell the 100% goal, because management has been disappointed in earlier efforts to train men to work safely and may be skeptical about trying again.

Two selling points, however, help put the idea across to management: 1) other companies have achieved 100% training and (2) the companies that have done it have improved their safety records measurably. But the best selling aid of all is the conviction and enthusiasm of Mr. Cress and Mr. Yanity. James B. Benson, chief of the Norton Branch, USBM, calls these men "self-starters." "They love their work and they're convinced it's good," he explains. "They know coal-mining backward and forward and they talk the miner's language. If you can only find two good men like these, all you have to do is give them their head. They'll put the program over.

In the Norton region, which includes parts of the domains of Allen Condra and Sam Caddy, presidents respectively of UMWA Districts 28 and 30, the full backing of local and district union officials has come easily and management and the union are working together in the cause of safety and safety training.

When the decision is made to bring the accident-prevention course onto a coal property, Mr. Yanity and Mr. Cress make only three stipulations: (1) it'll be no good unless they reach 100% of the men; (2) supervisors and miners must sit in the same classes and take the same course; and (3) the men must be trained on their own time. Presence of the supervisors, these instructors believe, convinces miners that everybody-management and men-is shooting for the same target. It also helps each group understand the viewpoint of the other. On the pay question, Mr. Yanity and Mr. Cress argue that the men must come for safety's sake, not for pay.

Next step is to call a conference to air the proposal for training and to agree on a place and a schedule for the classes. This conference draws in top company officials, the safety director, the superintendent and the mine foremen; the president of the local union and his mine and safety committeemen; some representative of union district headquarters; representatives of the state mining department concerned; and Mr. Cress and Mr. Yanity.

The plan is placed before the entire group for discussion and suggestions. That way, everybody knows what's going on, everybody knows everybody else's motives and the spirit of cooperation gets a substantial boost. Agreement on the plan enables officers of the local union to go before their men with a full-born program and assure them that everybody is working together for its success. That's a long step in getting 100% cooperation from miners.

WHAT THE COURSE TEACHES

"The more miners learn about preventing accidents, the less need they'll have for first-aid and mine-rescue courses," says Mr. Yanity.

That's the purpose of the accident-

prevention course.

Teaching is pitched to miners' needs. Both instructors know what these needs are. In the 20's, Mr. Cress was a laborer and a miner in anthracite; in the 30's, a fireboss and safety foreman; in the 40's, a supervisor until, in 1947, he joined the Bureau of Mines as an inspector. He has been teaching safety and accident prevention since early in 1949. Mr. Yanity has been in coal-mining for 40 yr. Before joining the Bureau as an inspector several years ago, he was a mine foreman. Both men studied in the Extension Division, Penn State College, and both later taught extension classes. With old-hand miners as well as superintendents attending their classes, Mr. Cress and Mr. Yanity must know what they're talking about. They do.

The course runs through ten 2-hr sessions. In that time, the instructors

cover the following subjects:

1. Falls of roof and coal—After 30 min or so to put students at ease and gain their confidence, the instructors get into their subject. They use blackboard sketches and diagrams to show the causes and effects of falls and, to bring the lesson down to earth, use mine inspectors' reports of roof and rib accidents occurring in the Norton region.

2. Haulage accidents—This session starts out with the USBM sound-and-color film on the job of motorman and brakeman. The film is followed by classroom demonstrations and an informal 30-min talk, laced with a minimum of statistics and a maximum of real case histories, on safe and un-

safe haulage practices.

3. Barricading—The session opens with the USBM color film on explosions and mine fires. Next comes a talk and discussion, with a typical mine map to work with, on what to do if fire or explosion occurs and how to barricade safely if escape is cut off.

to barricade safely if escape is cut off.

4. Prevention of fires and explosions—Another USBM film starts off

this session. Following the movie comes an informal talk on the causes of fires and explosions and ways to prevent them. Questions and discussion.

5. Mine gases and ventilation— Opening attention-getter is a realistic demonstration with a classroom-size explosion gallery. From that, the instructors swing into a non-technical description of gases normally found in a mine, as well as before and after an explosion or fire. They stress the importance of doors, overcasts and line brattice in maintaining good air.

6. Explosives and blasting—This is a crowded 2 hr. The instructors get through as much as they can of the following: permissible and non-permissible explosives, black powder and dynamite, storage and handling of explosives, blow-outs, over-charges, misfires, firing cables and shot-firing batteries. Also, there's a description of tests that should be made before and after shooting.

7. Coal and rock dust—The explosion gallery is brought in again, this time to show a coal-dust explosion—how it is propagated and how rock dust confines it. Miners thus learn how much rock dust to use, why dust samples are taken, and where, how and when mines should be rockdusted.

8. Roof-bolting—This session brings in a USBM film on roof-bolting. Instructors supplement the film with blackboard diagrams showing how bolts hold the roof and how they should be installed.

9. Electricity—Slides are used to show how motors are made permissible and how permissible equipment differs from non-permissible. Instructors lead a discussion of faulty electrical equipment, cables and switches; open motors; unguarded trolley wires; and exposed live electrical installations.

10. Miscellaneous subjects and wind-up—This final session ranges over such diverse subjects as safety clothing, caps and shoes; goggles and respirators; dust control; the hazards of smoking underground; and whatever other subjects the instructors think worth while or the students may want to hear about.

That winds up the straight 20-hr course for miners and mine officials. But, in addition, Mr. Cress and Mr. Yanity have set up the following special courses for special groups:

1. Safety refresher—Not content with their 20-hr course and convinced that safety needs a shot in the arm from time to time, Mr. Cress and Mr. Yanity return to each 100%-trained mine at regular intervals after the

course is done. They meet the men at the mine mouth for 30 min or so before or after the shift and review safety principles and details, answer questions and urge the men to practice what they've learned.

2. The flame safety lamp—This is a 4-hr special class for men who want to know more about the flame safety lamp—shotfirers, firebosses, machine operators, pumpers and mine officials. Students learn to disassemble and assemble the lamp, cap the gas and make tests in the methane-testing box.

3. Safety in tipple and shop—This short course is geared to the needs of surface workers, though some of the general subjects, such as haulage, electricity and fire, overlap the course

given to deep miners.

4. Safety for office workers—This, too, is a short course. It's aimed at men and women alike and covers such subjects as office housekeeping, fire prevention and safe use of office and desk equipment. For example, Mr. Yanity and Mr. Cress suggested at one office that desk spikes, on which memos sometimes are impaled, be bent over with point down to avoid hand wounds.

5. Safety in strip mines—Thus far, there hasn't been much call for this course, since most of the stripping operations in the region are quite small and, in many instances, short-

lived.

6. Safety for mine officials—This course, comprising one 4-hr or two 2-hr sessions, is for mine officials only and therefore is more technical than the course for miners.

HOW THE TEACHING IS DONE

"The men who resisted most at first have become our strongest supporters," says a mine superintendent.

That statement is a measure of the interest that Mr. Yanity and Mr. Cress create in their classes.

How do they keep interest high? Here's their strategy:

1. They use visual teaching helps. USBM films, most of which are excellent, are the major interest-catching aids. The pictures are realistic and easy to understand. Besides films, the instructors use lantern slides, deskize explosion galleries, mine maps and a variety of home-made exhibits.

How effective these visual aids are is pointed up in the comment of a mine committeeman at a mine where 100% of the men recently completed the course. He said: "That explosion box that showed how coal dust gets blown in the air and spreads an explosion was about the best thing in the course. The moving picture about haulage was just right, too. It was so

real that it scared some of the men, but it's good for them to get scared about haulage because haulage kills

a lot of men.

2. They change pace often. In a session on barricading, for instance, Mr. Cress opened with a 10- or 12min talk about explosions and fires. His speaking voice is naturally lowpitched; his manner, easy-going. Next came the film on fires and explosions, lasting some 30 min. After the film, Mr. Yanity—a man of quick motions and a penetrating but pleasant voicetook over. "Suppose you were caught in a fire or explosion like one of those you saw in the movie. What chance would you have to get out alive?," he asked. With that transition, he was on the subject for the day-barricading. He talked rapidly and factually about where and how to build a barricade, using a mine map to illustrate his arguments, and then by questions and challenges brought members of the class into discussion.

In short, no one voice, no one teaching aid, on one teaching method is permitted to tire the class. The result is a fast-moving, varied and effec-

tive presentation.

3. They keep it practical. In talking about explosions, fires, gases and barricades, neither instructor talked learnedly or at length about the chemistry of mine gases. Instead, their talk was simple and practical, suited to a miner's experience. For instance, here are some of the things the instructors told the men to do if they were cut off by fire or explosion: select a place to barricade that's far from the fire or explosion but easy to barricade (for example, a place with one or two entries is easier to seal off than one with four or five entries); take your tools and dinner buckets along, because you may be shut off for a long time; build the barricade quickly, because gases travel fast; if you can't find water to mix with dust to make a plaster for sealing, get the men with you to urinate; select a leader and follow his orders; after the barricade is built, put out your flame safety lamp, because it uses as much oxygen as a man; scatter the men among several places in the sealed-off area to avoid a concentration of CO2 from their breathing; don't get desperate and break down the barricade to get out, because if rescuers can't get in, you surely can't get out; keep a noise going all the time to draw the attention of rescuers.

4. They get miners to take part in discussion and demonstration, but not in the first session or two. The instructors believe it takes their students a little time to shake down, see

how the class is going, overcome their timidity and doubt, and gain confidence in their teachers. Usually, the first two sessions are enough for the shake-down. After that, Mr. Cress and Mr. Yanity ask questions freely, urge their students to raise questions and take part in discussions, and invite them to the front of the class to take part in demonstrations. This, by the way, is another change of pace.

5. They don't use textbooks, don't refer to notes and don't give examinations. The absence of books and notes shows the men that the teacher is talking from his own experience and thus builds up their confidence in him. The ban on examinations removes any fear a miner might have of being shown up in contrast to his buddies.

6. They keep the men looking forward to the next session. The last 10 min or so of every 2-hr period is a capsule preview of what the next session will be about. That way, the new subject is planted in the men's minds until the next class.

GETTING THE MINERS OUT

"Nothing less than 100%." That's the goal Mr. Yanity and Mr. Cress require agreement on before they start up an accident-prevention course.

The magic of their story is that

they reach their goal.

What makes them successful?

Getting 100% of the miners out for the course requires 100% cooperation from everybody—management, local and district unions, the men themselves, and the instructors.

Here's how one mine went 100%, according to the president of the

local union:

"We got most of our men on the first go-round—over half of them, I'd say. They were the men who were really interested in safety. Next, we picked up the men who were willing to come because Jim or Bob had come. These made up the next 30 or 40% and they came along all right, without any pressure.

"The rest of the men took a little working on. We tried to size up each holdout and work on him the way that suited him best. Sometimes it was best for us union officers to talk to him. We'd kid him, or shame him, or talk straight to him, or plead with him to help us go 100%—any way that would bring him around. We even talked to some of them at their homes, with the wife and children in the room. We always had the wives and children on our side, and they helped. Sometimes we got our district men to help us with a holdout. They've

backed us up 100%, And Mr. Cress and Mr. Yanity talked some of the hardheads into coming."

A mine committeeman at the same mine put it this way: "We had a little trouble with a few hardheads but we finally swung them around. We had a few, for instance, who'd hang around the store after the shift while the others went to class. Later, they'd all ride home together. I guess the men who went to class must have told the others how good the course was. Anyhow, most of those who didn't come in at first asked to be let in later. They only asked that nobody laugh at them for changing their minds."

The president of another local said: "We didn't use any pressure on the holdouts. We just used persuasion. I got some of them out myself."

A committeeman at the same operation said: "We know who makes safety work. The miners do. So we try to show our men that safety is their responsibility and they've got the most to gain from it. We know we've got to keep them thinking about safety and working at it all the time. That's why we suported this training every way we could."

District union officials also back up the training. Bart B. Bloomer, safety director of UMWA District 30, has helped organize classes in eastern Kentucky and Robert Condra, international representative, UMWA District 28, often turns up unexpectedly at accident-prevention classes. When Mr. Condra is present, the instructors give him the floor for a few minutes, in the course of which he praises the men for coming out and talks about the benefits that will grow out of 100% attendance.

Like the others, company officials do their part to get the men out. "We used to try to ram it down their throats," says one company president. "Maybe that's why we never got very far before. But now we use persuasion. It works where high pressure

and threats failed."

The superintendent of a mine that went 100% last spring attended all classes held for all three shifts—a triple dose for him but a shining example to his miners—and checked attendance himself at the door. He was especially successful in bringing the stragglers in because he grew up near the mine, started work in the mine where he now is superintendent and therefore knows every man by first name and check number. He reports that he's driven or walked up many a Kentucky hollow to talk a man into coming to classes. "Mr.

Yanity and Mr. Cress made a convert out of me," he says, "and now I'm making converts out of my men."

Besides company and union officials, the Bureau of Mines men also play a strong role in putting the training across. As Mr. Benson, USBM chief at the Norton office, puts it, "Most miners already know how to work safely. But this course builds up the motives for safety, it makes safety graphic and real and it makes miners safety-conscious. We want to get them all in."

That's where Mr. Cress and Mr. Yanity come in. Here's how they persuade miners to come 100% to their classes:

They make their classes lively and interesting, as explained earlier, and thereby attract the men. The word gets around, and others come in voluntarily.

They take the lion's share of responsibility for persuading stragglers. Between sessions and in other spare time, they drive many a mile over mountains and up hollows to persuade men to come to class. They also talk with wives, sons and daughters. As Mr. Yanity says, "If an instructor can't sell and organize his class, he can't teach it."

They meet the convenience of miners. They work at any and all hours, before the shift or after, as many shifts a day as may be needed, and any and every day in the week. A day's schedule sometimes runs from 4:30 or 5 a.m., when a class is scheduled before the day shift, to nearly midnight, when a class meets before the "owl" shift. In addition, a day like that often means a 40- or 50-mi drive to the mine and return. They set up Saturday and Sunday classes for men who have farming or gardening to do before or after the shift and for men who drive 50 mi or more to work and who therefore prefer not to report for 2 hr before or after the shift. A Saturday or Sunday class may run two and a half 8-hr periods instead of the usual ten 2-hr periods. Finally, there are a few men in the region whose religious scruples forbid them to watch moving pictures. For these men, special classes are arranged without the films. In short, Mr. Yanity and Mr. Cress go to any length to make their course easy on the miners.

Recognition for achievement is the one remaining motive that brings miners out to the classes. Nearly everybody joins in providing this motive. The Bureau of Mines presents a handsome certificate, suitable for framing and display, to every mine

and every local union where 100% of the miners complete the accident-prevention course. In addition, the Bureau provides a billfold-size certificate for each worker. Some day, according to a safety director in the region, this pocket certificate may become a requirement for employment in the mines.

The UMWA also confers a certificate of achievement on the local union after training is completed 100%. Signed by John L. Lewis, this certificate now hangs on the walls of some 20 union meeting halls in UMWA Districts 28 and 30.

More often than not, award of the certificates is a gala affair, with wives and children present as well as top representatives of the Bureau and the UMWA, company officials and district union officials, and local politicians and celebrities. Sometimes, the company and the local union contribute jointly to a fund for door prizes, candy or favors for wives.

MEASURING THE GAINS

How can the merits of the course and the gains of the men and the company be measured?

Here are some of the yardsticks for gaging the miners' feeling about the

- As a group advances through the course from session to session, attendance picks up instead of tapering off.
- Men who finish the course help greatly in breaking down the holdouts.
- Miners turn out consistently even for sessions scheduled before sun-up or close to midnight.
- Men who live as far away as 50 mi willingly drive the distance on Saturday or Sunday to take the course.
- 5. A month or so after the course is completed, some 98% of the men come voluntarily to the refresher class, usually held at the portal. As one miner said, "If Mr. Cress and Mr. Yanity are there, I'll be there."
- 6. A good many men who have completed the course have gone ahead, on their own, to seek certification as mine foremen. One company reports that 75 of its men have made the effort.
- 7. The number of grievances at some mines, if not all of them, has dropped off since the men took the course and safety committees now work more cooperatively with management. A safety committeeman reports that his committee hasn't had much to do since the mine went 100% for training. "The men used to bring their complaints on safety to the committee. Now they report viola-

tions to their foreman and talk them over with him. Most of the time they reach agreement on the spot. That's because they understand each other now. They've both had the same training."

But whatever other yardsticks may be used to measure the effectiveness of the course, the key yardstick, as always, is the safety record. With but one exception in the region, real gains in safety have followed completion of the course by 100% of the men at the mine. Perhaps not all that improvement can be credited to the course. Yet the men in the region agree unanimously that the course carries off a big share of the credit.

WHAT'S NEEDED FOR MORE SAFETY?

What's needed to spur 100% training and bring further safety advances in other mines and in other regions?

One operating official, reflecting the views of others in the region, made this observation about the course and its results: "The record in our region shows that you can do a lot more to speed safety by training miners in accident prevention than you can do by inspecting mines. We'd be better off if we spent more money on training like this and maybe a little less on inspections."

Another thing that's needed is more instructors—instructors like Mr. Yanity and Mr. Cress, one mine official says. He expressed it this way: "In too many instances, the Bureau has taken its inspectors and other workers who were getting pretty well along in years, or were not very good in other lines, and made them into instructors. That's not very good. Instructors should be the best-caliber men available."

Mr. Yanity and Mr. Cress expect to keep on with their work. In time, if they keep on as they're going now, they'll sell their convictions to every sizable company and every local union in the Norton region. An ever-improving safety record doubtless will continue to reflect their work.

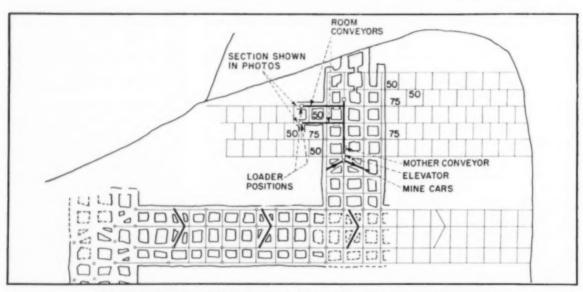
With top-quality instructors, with backing from everybody and every organization concerned and with determination to stop at nothing short of 100%, the coal industry in southwestern Virginia and eastern Kentucky is making real gains in safety. The same opportunity for improvement beckons to coal companies, miners union officials and USBM men elsewhere. The key to that opportunity, as the Norton story shows, is the will to join forces and advance together.



IN LOADING a 25-ft fall, transfer of coal to the room conveyor is taken care of by the bridging unit and the operator concentrates on the "business end" of the high-capacity loading machine.

Bridging Units Produce 44 TPM

High-capacity loading machine and bridge-type conveyors maintain 38 tons per man-shift, including moves. Coursing intake air "the long way" through area of sand-rock top adopted to reduce spalling of shale roof in main entry.



Mining Plan for High Output in Bridge-Conveyor Sections

WORKINGS AND PROJECTIONS, with location of equipment indicated at the time the accompanying photographs were taken. Heavy lines show circle haulage at loading points handling trips of 15 cars entrain. Rooms 25 ft wide are driven in pairs on 50-ft centers. One loading machine serves two rooms equipped with bridge conveyors, loading the 25 ft fall of coal in one place while the other is being cut, drilled and shot.



BRIDGE CONVEYOR is carried by a special short boom installed on the loading machine and is easily disconnected when the cut is completed and the loading machine moves to work the adjoining companion room.

In Mining Air-Tempering Area

PRODUCTION calculates out at 44 tons per man-shift on the section, including supervision, with a modified 14-BU loader and two Piggyback conveyors in a 66-in working height at the Blair Fork No. 4 mine of the Jewell Ridge Coal Corp., Tilford,

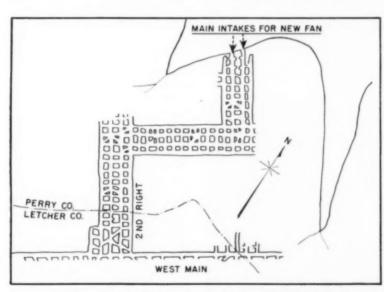
Perry County, Ky. As a matter of fact, the 44-ton production is the average, accomplished without any attempt to exploit the equipment. Under present working conditions, a 38-ton-per-man average, including all conveyor moves, can be maintained.

Section tonnages are total material, with reject at the preparation plant running 12½%.

Mining is in the Leatherwood seam, which lies practically level and is above drainage. At Blair Fork, the seam averages 54 in thick but ranges 12 in or so above and below that height. Except for the Piggyback-conveyor section, face haulage is handled with shuttle cars. The Piggyback equipment was purchased primarily to mine a section of 44-in coal with soft bottom. After that was worked out, the Piggyback equipment was moved to its present location in a high-coal area with a soft fireclay bottom.

This area is being mined in a particular way, with pillars left standing to serve a specific purpose. While most of the mine has a shale top that spalls badly during warm months, the Piggyback section has a strong sandrock top. Recently a new Jeffrey 6-ft Aerodyne fan was installed at a drift opening on the opposite side of the mine. It operates exhausting and the main intake to the mine will be via drift portals through the Piggyback section. There the air will be coursed through pairs of headings and zigzagged a sufficient distance to be cooled and drop its moisture on the durable sand-rock top instead of in the main entry where moisture causes

The special short boom for the Joy

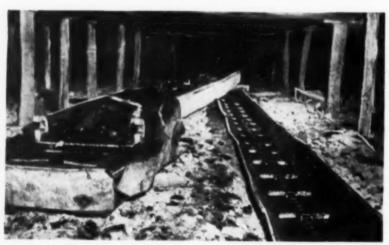


Tempering Intake Air to Prevent Spalling

COURSING INTAKE AIR "the long way" through this area will permit it to drop its moisture on the durable sand-rock top before reaching the main entry where the shale roof spalls badly during warm weather. New fan recently installed on opposite side of mine is operated exhausting.



HIGH-CAPACITY CONVEYORS are required to handle the coal coming off the combination loader-bridging unit.



BRIDGE CONVEYOR is parked in one working place (looking outby), while the loading machine works with a similar unit in the companion room.



AT THE TRANSFER POINT, a 25-hp room conveyor with 12-in chain discharges to a mother conveyor of the same size for delivery to mine cars.

14-BU loader, the two Piggyback conveyors, two room conveyors, two mother conveyors and the elevator were supplied by the Long Super Mine Car Co., Oakhill, W. Va. They consist of 3-Type P.T.15 Piggybacks; 400 WT15 room and mother conveyors, equipped with chains 12-in wide, troughs 15 in wide at the bottom and 25 in at the top, and 25-hp drives; and a 400 EL elevator with a 10-hp motor. Section equipment also includes two Goodman 512 shortwalls, two Chicago Pneumatic 572 handheld electric drills and a Sullivan spotting hoist. Shooting is done with permissible explosives.

Places 25 ft wide are driven in pairs on 50-ft centers. Breakthroughs are driven 18 to 20 ft wide. The room conveyor is positioned with its center line 10 ft from one rib and two rows of posts are set, each 5 ft from the respective rib, thus leaving 15 ft of open space along the center.

One place is loaded while the other is being cut, drilled and shot. A mining machine stays in each place. After finishing a place, the loader backs the Piggyback out of the way, disconnects from it, trams to the companion place, picks up the other Piggyback and resumes loading. The 25-ft fall of coal is loaded without interruption and as fast as the operator can maneuver the front end of the machine. He pays no attention to the boom, since the Piggyback bridges the gap to the room conveyor.

Room conveyors are extended to 300 ft, and the drives and mother conveyor then are advanced to the next position 250 ft inby. Circle haulage is employed and one loading point serves either for driving both pairs of headings to constitute a 4-heading entry or a group of four rooms, as the case may be. Trips of 15-cars are handled entrain.

Eleven men, including the section boss, are all the men employed in the Piggyback section. The crew consists of two mining-machine operators, shooter, loader operator, loader helper (also an operator), timberman, supply man, pan man, mucker and boom man.

Blair Fork No. 4 mine was opened by the Jewell Ridge Coal Corp. in 1949. It currently is producing 4,000 tons net clean coal per 2-shift day. The 3 x ¼-in is washed in a McNally-Pittsburg jig. Markets are steam and domestic.

F. F. Stewart is superintendent of Blair Fork No. 4 mine. The Jewell Ridge Coal Corp. is headed by Huston St. Clair. Charles E. Walker is executive vice president, and L. I. Cothern is director of engineering.

Mine-Trailing Cables

How They Are Made . . . How to Make Them Last Longer

You can get longer cable life if . . . you know what goes into making a cable . . . you do not expect it to do more than it can. This is how a cable expert explains cable construction, causes of trouble and how to overcome them.

By STEVE BUNISH
Anaconda Wire & Cable Co.
Marion, Ind.

MINE-TRAILING CABLE construction has undergone many changes and improvements to meet the requirements of modern equipment. Some of the cable manufacturers' best engineers are working continuously for more improvement. Among the materials leading to better cables are hightemperature, long-aging rubber insulations; and tough, abrasion-resistant and heat-conducting neoprene jackets instead of rubber. Improvements in design have included the cord-reinforced jacket; stranding techniques; make up of grounding conductorsflat for twin cables, rubber-cored for round cables; protection of grounding conductors against crushing and short circuiting; and unified mechanical design resulting in improved tensile strength in the cable and greater resistance to damage from excessive tension.

Though they are not new, some previous improvements are important. Among these are a dense, abrasion-resistant smooth jacket for best protection against hard service; continuous brand labeling for complete and permanent cable identification; and use of synthetic rubber for insulation instead of natural rubber, for better over-all performance.

CABLES FOR MINE SERVICE

Trailing cables used in supplying power to equipment at the mine face or in transporting material from the face can be divided into five groups. Each of these has a characteristically different construction designed to better fit it to the specific application.

1. Gathering Locomotive Cable—Gathering locomotive cables are made up with a single, flexible insulated conductor. A reinforcing web or open braid is placed over the insulated conductor. This core (Fig. 1) is then cov-

ered with a tough protective sheath or jacket. This construction is designed to withstand the constant reeling, bending and rough usage encountered in the operation of a gathering locomotive.

2. Flat Twin, with and without grounding conductor—In flat-twin construction, two flexible, insulated conductors are laid parallel. If a grounding conductor is desired it is positioned between the two insulated power conductors. Reinforcing members, such as rubber fillers, braids, webs or breaker strips are placed with or around the parallel members. This core is covered in a tough jacket. The illustration (Fig. 2) shows a special shape of conductor insulation, but it also may be round.

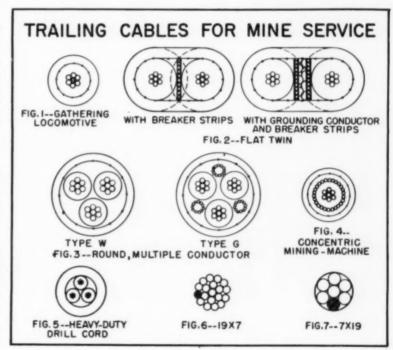
Flat-twin cables are the most popular for face-mining equipment. They are made in a wide range of sizes, can fill most power requirements, and are designed to withstand bending around

small-diameter sheaves, cable drums and guides. The parallel construction offers considerable resistance to runovers and physical abuse. Their relatively small diameters make them light in weight, flexible and easy to handle.

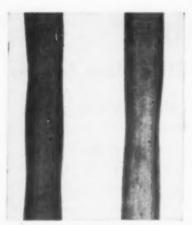
3. Round Multiple Conductor— Type W & G—Type W cables (Fig. 3) are made up with either three or four flexible, insulated conductors, each identified by colored compounds or by tape or braids over black insulation. These conductors are cabled together and the resulting core is then protected by two jackets with a reinforcing web or open braid between them.

Type G cables are made up similar to Type W cables except that grounding wires are placed in the interstices of the cabled conductors.

Round multiple cables, used on AC equipment, are made in a wide variety of sizes. They are tough, flex-



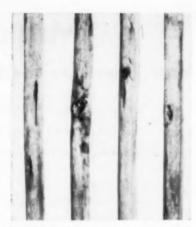
Adapted from a paper presented at the AIEE Middle Eastern District Meeting, Charleston, W. Va., Sept. 29-Oct, 1, 1953.



EXCESSIVE TENSION, shown by necking down in hour-glass shape, indicates cable was stretched.



CRUSHING has occurred to such an extent that variation in diameter is seen. Cable was run over or pinched.



CUTTING and crushing have resulted in severe damage. The second specimen from the left was almost severed.

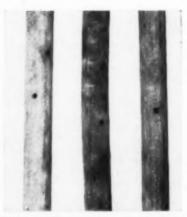
10 Ways to Mistreat Your Cable



SNAGGED and torn jacket can go undetected for some time because the conductors are still separated.



EXCESSIVE ABRASION (left) has damaged the jacket. Overload is evidenced by formation of blisters (right).



PUNCTURES have damaged all three of these trailing cables. In wet sections electrical failure would result.



POORLY-TAPED temporary joints permit water to enter. Tape should be carried over original insulation.



POOR TERMINATION with unconnected grounding conductor is shown.
Conductors should be equal in length.



POOR TEMPORARY REPAIRS and joints mean trouble. Ground conductors sometimes are cut and left open.

TRAILING-CABLE MAINTENANCE TABLE

Causes of Damage		Evidence of Damage	How to Avoid Damage						
1.	Excessive Tension	Cable necked down resembling an hour- glass in shape.	Install spring-type shock absorber at power source.						
		Jacket creeping back from temporary splice.	Keep proper tension on trailing cable reel.						
		Grounding conductor pulled in two.	Adjust cable reel to prevent back-spooling.						
II.	Mechanical Damage	Short sections of cable crushed or flattened to a larger diameter (major axis)	Avoid run-overs.						
		Excessive abrasion, cable grooved or shows uneven wear.	Replace broken sheaves or broken guides.						
		Gouges, cuts and punctures.	Do not pinch cable between equipment and rib, roof or mine bottom.						
111.	I. Current Overload	Blistered jacket.	Choose cable with an adequate current rating. Consult cable manufacturer or mining-machine manufacturer for recom- mendations.						
		Jacket on the bottom layer of cable on the cable reel hardens and cracks.	When the cable is removed for permanent splices, reverse cable ends.						
		Tinned copper conductor wires turn to a blue-black color.	When operating only a short distance from the power source, remove cable from reel and place it where it will be well ventilated.						
IV.	Temporary Splices and Terminations	Bare conductors exposed in a temporary splice.	Carry insulating tapes back over the origi- nal conductor insulation, and replace temporary with permanent splices as soon as possible.						
		Open ground conductor.	Connect grounding conductor in all splices and terminations.						
		Kinked cable.	Balance the conductors in all splices and terminations so that there will be an even stress on all conductors.						

ible and designed to take the physical abuse encountered in mining.

4. Concentric Mining - Machine Cable—In concentric mining-machine cables (Fig. 4), individual wires are stranded concentrically around a flexible, insulated conductor. A reinforced covering is then applied around this core.

Concentric mining-machine cables find limited use on gathering locomotives and other mining equipment. They have the advantage of small diameters but they are not designed to take the twisting, bending and physical abuse that trailing cables receive in modern mining.

5. Heavy-Duty Drill Cords—Heavy duty drill cords (Fig. 5) are made up with flexible, insulated conductors cabled together with appropriate fillers. They are then covered with an extra-heavy jacket that offers additional protection against physical abuse.

All cables are basically one or more conductors with electrical insulation and a protective jacket. The heart of any trailing cable is the stranded conductors made of annealed copper wires.

FLEXIBLE STRANDING

The flexibility of a conductor, its elongation at rupture and its resistance to fatigue breaking upon bending or twisting, depend on the design of the conductor. Two important factors to consider in designing a flexible copper conductor for mine trailing cables are:

1. The size and number of individual wires required to obtain the desired cross-sectional area of copper and the necessary flexibility. Generally, and within limits, the smaller the wire size the better the conductor flexibility.

2. The direction and length of lay of both the individual ropes in a conductor and in the final stranded conductor. These factors play an important part in the mechanical behavior of the cable. Mine trailing-cable conductors are usually made up with 133 or 259 wires, and can be stranded in a variety of ways. For example, a 133-wire strand can be made up in the following ways:

A. Nineteen ropes of 7 wires each (19x7). In this construction one rope is used as a core. Six ropes are then concentrically stranded around this

core. This is followed by another layer of the remaining 12 ropes. The individual ropes can be concentrically stranded or bunched (Fig. 6).

B. Seven ropes of 19 wires each (7x19). In this construction one group of 19 wires is used as a core. The remaining six ropes are stranded concentrically around this core. The individual ropes can be concentrically stranded or bunched (Fig. 7).

CONDUCTOR LAY

The direction in which copper wires are stranded also can be varied. Typical designs are as follows:

1. Standard Lay—The lay of the individual ropes in any one layer of the stranded conductor is the reverse of the lay of the layer. The lay of each layer is alternated right-hand, left-hand. The final layer is usually left-hand lay.

Unidirectional Lay—In this construction the individual wires making up each rope are stranded in the same direction as the final stranded conductor.

3. Herringbone Lay-This type of lay is usually used in 7x19 or 7x37 construction.

The direction of lay is reversed in alternate ropes in the outer layer. Whenever a trailing cable is in service, the stranded copper conductors are subjected to compression, shear, torsion and tensile stress. Stranded conductors with a standard lay and made up with seven ropes seem to give better service than 19-rope constructions.

A herringbone lay is often used in single-conductor gathering-locomotive cable constructions. The location and action of the locomotive cable reel subjects a cable to considerable torsion, and herringbone lay seems to balance these torsional stresses. Undirectional lay, used in some steel-rope constructions, is seldom used in electrical conductors.

For the ultimate in mechanical performance, the foregoing points must all be considered in designing a cable which will have fatigue resistance and a proper balance between various metallic components so that under severe tension a grounding conductor, for example, will not break before the power conductor.

INSULATION

Insulations for mine trailing cables should have the following characteristics:

1. Adequate electrical properties.

2. Physically tough-high resistance to compression cutting.

3. High resistance to oxidation and deterioration from heat. The majority of cables used on face equipment are rated at 600 v. These insulations at present are for the most part made up of Buna S (GRS) rubber.

Heat-resistant-grade insulations meeting ASTM Specification D 754 make a quality insulation for trailing cables. They are characterized by long life, high electrical values and good mechanical properties. The maximum permissible copper temperature for cable insulation with heat-resistant grade is 75 C.

Natural-rubber insulations generally become soft and plastic at the veryhigh temperatures reached when trailing cables are electrically overloaded. Buna S compounds make desirable trailing-cable insulations because they do not exhibit this tendency. At temperatures up to 100 C they do not have the mechanical strength of natural rubber compounds but at much higher temperatures they are better.

JACKETS

The protective coverings or jackets of trailing cables should be highly resistant to acid mine waters, oil, mud and grease. They should have good flame resistance and should be characterized by physical properties that include high resistance to abrasion, compression cutting and tearing.

The most widely-used rubber for jackets is neoprene. Its inherent chemical properties give it good flame and acceptable oil resistance. The choice of proper compounding ingredients will enhance these properties and also give the desired physical properties.

Cable manufacturers are constantly doing research to improve trailing cables. New methods of stranding, the use of synthetic rubber and new cable designs all have contributed to increased cable life.

However, a large part of the responsibility for longer cable life depends upon the user. His choice of cable and the way in which he uses it will in the long run determine how long it will last.

HOW TO GET MORE CABLE LIFE

Recognition of the physical and electrical limitations of mine-machine cables, plus an effective maintenance program, will increase cable life, decrease down time and improve protection against damage and hazards. Breakdowns are neither mysterious nor unaccountable and almost without exception can be traced to one or more of the following causes:

- 1. Excessive tension.
- 2. Mechanical damage.
- 3. Current overload.
- 4. Poor temporary splicing and termination technique.

It is true that mine trailing cables have short lives, but they can be made long-lived by better maintenance and careful handling on the job.

To supply electric energy to portable equipment, such as, shuttle cars, loading machines and cutting machines satisfactorily, trailing cables should meet the requirements previously mentioned. To date, no one group of materials can be used to build cables that satisfy all these requirements. The most useful conductor is stranded copper and the most successful insulation and covering is Type RH-RW or equivalent, with neoprene jacket.

Once the user recognizes and accepts the physical and electrical limitations of a trailing cable and keeps within them, he will begin to benefit from longer cable life and increased safety.

Recognition of the limitations of trailing cables can come from sad experience on the job or it can come, more intelligently, from a knowledge of the most common causes of cable

failures. Knowledge of causes of cable failures, in turn, can lead to development of a more effective maintenance program.

AVOID EXCESSIVE TENSION

An outstanding cause of mine trailing-cable failures is excessive longitudinal tension on the cable. Sometimes, despite tension devices on the mining machines, it is possible to get sufficient strain to damage cable jackets and break conductors. Yet, very often, in advance of an actual break, warning signs appear that suggest trouble is on the way.

One good indication of excessive tension is the necking down (or hourglass shape) of a section of cable, a condition that occurs frequently in smaller sizes.

The story behind "necking down" of the cable is this: When copper conductors are stretched, considerable tension is exerted before any appreciable elongation takes place. By test it has been found that a stranded copper conductor will elongate 20% before it will rupture. (Once the conductor stretches, by the way, it will not return to its original position.) For this necked-down condition to occur, a cable must have been stretched almost to its breaking point.

The tension necessary to bring about the condition is considerable—from 1,500 lb to 3,000 lb, depending on cable size. Yet, apparently, cable is subjected to such extraordinary force. We have found definite evidence of such excessive tension in No. 4 AWG parallel cables with grounding conductors. That cable has a breaking strength of approximately 3,200 lb.

Another method of determining the degree of tension that has been applied to a cable is to check the lay of the stranded copper conductors. Stranding of copper conductors, as you probably know, is a precision operation, and the lay of conductors greatly affects the fatigue resistance and flexibility of a cable. Excessive tension applied to a cable during service lengthens the lay and, in turn, affects fatigue resistance and flexibility in the conductors.

Finally, the protective sheaths of mine trailing cables are much more vulnerable to damage when under mechanical stress. Unfortunately, up to now, standard equipment for abrasion, compression cutting and other wear-simulating tests for cable jackets is not adapted to applying stress to the test specimen. One simple test, however, will demonstrate the difference in cutting strength. Cut through

a section of jacket on a cable held straight, then bend an uncut section sharply and cut again (across the cable). The difference is very evident.

PREVENT MECHANICAL DAMAGE

Mine trailing cables are manufactured to extremely rigid diameter tolerances and, without the aid of a micrometer, it would be difficult to detect any variation. Therefore, should a cable section show any noticeable diameter variation or flattening, it could only have happened because the cable was subjected to crushing or compression.

"How?" would be your first question, assuming you are out to achieve better cable maintenance.

Your cable may have been crushed in one of several ways: (a) running over the cable with mining equipment, or (b) pinching the trailing cable between the frame of a portable machine and the rib, roof or mine bottom. The latter kind of mechanical damage can be severe; often it will cut a cable almost in two.

Experience has shown that the parallel-type cable, in its ability to withstand the effect of crushing, is superior to either the concentric construction or to the multiple-conductor round cables with conductors twisted (Type W). The parallel-conductor cables usually lie flat on the mine floor and resist the tendency, under crushing, of driving copper to copper. When either of the two types is run over, a conductor-to-conductor short circuit is more likely to occur.

The extent of damage resulting from crushing isn't always immediately evident, especially when the cable is used in a dry section of the mine. The insulation and jacket may contain initial breaks that leave an opening from the conductor to the outside of the cable. Electrical failure will not occur because there still is an effective separation between the conductors or an outside ground. Take the same cable into a wet section, however, into an area of the mine containing water with a relatively low electrical resistance, and immediately you're in difficulty.

Whenever a trailing cable in service is grooved, shows uneven wear, or is abraded deeply in localized sections, it is a good indication that the cable has sustained mechanical damage under conditions beyond those for which it was designed.

The practice of terminating the cable of a shuttle car at some intermediate point on its run, other than the discharge point, also can cause cable damage. This results from the sudden tension imposed on the cable when the car runs past the terminal point. Here, the cable reel must reverse direction of rotation almost instantly. However, because of the inertia of the 400-lb cable reel, it fails to do so, with the result that the cable takes the strain and is sometimes completely severed, or at least, greatly stretched. This latter condition, particularly in parallel-type cables has been found responsible for occasional damage to the grounding wire.

REDUCE CURRENT OVERLOAD

The following are conditions that can be expected when a trailing cable is subjected to high current overloads and resulting elevated temperatures:

1. The resistance of the copper conductor is increased, the voltage drop in the cable is increased, and a reduced voltage is supplied the machine, which automatically calls for more current with added heating.

2. Rubber insulations and jackets will be more vulnerable to physical damage, such as cutting and tearing.

 Under extreme conditions (stalled motors), the copper conductors can be overheated to the point where the entire cable is a fire hazard. It must be remembered that even metals will burn at sufficiently high temperatures. The neoprene sheaths on mine trailing cables have excellent resistance to flame over a wide range of temperatures, but they will burn if sufficiently overheated. Copper temperatures of 600 F and higher are necessary, but it is possible to generate such temperatures under certain conditions. Cables can be electrically overloaded by the following:

1. Too small a conductor.

Operating at low voltage-excessive cable lengths.

 Decrease in cable rating because of the number of layers on the cable reel.

4. Inadequate or non-operating overload protection.

The most likely location to look for the effects of current overload is the section of cable remaining on the cable reel, Evidences of overload might be:

 Badly discolored conductors. At moderately high temperatures, tin coatings on copper will acquire a yellow-gold cast; at higher temperatures such coatings will have a dull blue cast.

 Conductors are brittle, or very soft. When synthetic rubber compounds have been heated excessively for long periods of time they tend to become hard and brittle. Natural rubber compounds tend to soften and become plastic.

 Blisters have formed between protective sheaths and cable core. Excessive temperatures generate gases which, restrained by the cable sheath, form gas pockets under considerable pressure.

Current rating for cable is based on one cable in air, with nothing near it to prevent removal of heat by natural movement of air adjacent to its surface. When a cable is wound on a reel, even in one layer, it is no longer able to depend upon full natural ventilation. Consequently, heat is not removed as rapidly and current rating must be reduced to prevent damage to the cable. Corrected values for cables on gathering reels are as follows:

No. Layers on Reel	Correct Value— Multiply Rated Value by Factor								
1	0.85								
	0.65								
	0.45								
	0.35								

AVOID POOR SPLICES AND TERMINATIONS

Splices and terminations poorly made will lessen the electrical efficiency of a cable. They can become a hazard to operating personnel.

Some of the most common examples of poor splicing techniques in making temporary splices are:

- Cutting out the grounding conductor, leaving an open ground.
- Failure to cover conductor completely with insulating tapes, leaving bare wires exposed.
- Failure to balance the length of spliced conductors so that there is even tension on all conductors.
- Cutting or breaking individual wires during splicing operations.

Following are three good "rules" cable-maintenance men might follow to prevent the above-mentioned conditions:

- 1. The grounding conductor at the terminal ends of a trailing cable always should be connected. Failure to do so defeats the purpose of the grounding conductor. It turns what was intended to be a safety device into a possible hazard.
- To prevent cables from kinking, the conductors at the terminal ends should be of equal length, or they should be so attached that there will be even tension on all conductors.
- Finally, and at the earliest opportunity, permanent vulcanized splices should replace temporary ones.



HIGH-CAPACITY MACHINES for all operations in modern stripping provide for maximum yardage and tonnage removal with least expenditure of man hours up to the limit where deep overburden destroys cost advantages of stripping.



FAST, HIGH-CAPACITY HAULAGE of both coal and overburden demands good trucks, properly surfaced and graded haul roads and top-notch truck maintenance. Paired with a matched loading unit, trucks get the nod in today's haulage.

Modern stripping takes high-capacity machines and smooth operating cycles

A LOT OF ATTENTION—That's what auger-mining receives from strip-mine operators because of the promise this new method holds for lower mining cost, longer pit life, higher productivity and increased recovery.



Stripping Today . . .

What it takes in equipment, methods and engineering skill

LARGE POWERFUL SHOVELS AND DRAGLINES for handling deep and hard overburden, high-speed dry-type vertical overburden drills capable of drilling 2,000 ft of blasthole in one shift, high-capacity haulage units and special service units are marks in today's strip mines. Emphasis is concentrated on machines and methods to conserve manpower and to tackle tougher mining problems.

Today, stripping accounts for 23% of bituminous and 26% of anthracite production and probably will continue to increase its share in the immediate future. Tonnage from surface operations has increased almost 300% over the 1935-39 average. Development of the highwall auger provides a method of prolonging the life of strip properties by producing low-cost coal, and recovering coal that could not otherwise be recovered economically. While average thickness of coal stripped remains slightly over 5 ft. the overburden ratio has moved up to an average figure of 10.7 to 1. Some of the larger operations are successfully stripping where the ratio averages 15.5 to 1 and sometimes goes as high as 26.6 to 1.

STRIPPING LIMITS EXTENDED

Partially offsetting the advances in equipment is the depletion of economical strip reserves in some areas. However, new developments in drilling, blasting techniques, stripping, loading and haulage equipment already are opening new possibilities. In view of the great cost advantage of stripmined coal, greater emphasis on improving both machinery and methods may be expected in the future in an effort to prolong stripmine life.

Draglines with buckets up to 35-yd capacity and shovels up to 50 yd are favored for removing large volumes of thick overburden.

Where large stripping units cannot be used because of natural conditions or limited coal reserves, a variety of equipment in various combinations is used. For example, where the overburden is fairly soft, tractor-scraper units are used effectively to remove up to 30 ft of overburden. An advantage of using this type unit is that the spoil can be spread in a



NEW ENTRIES in the equipment field include scoop shovels like this for efficient mining of overlying thin seams to increase total recovery.

New and useful equipment and ideas . . .



NEW IDEAS IN DESIGN, and use of new materials, packs higher capacity into existing machine. This lighter, better-biting, 46-yd bucket replaced a 35-yd unit.

manner that permits backfilling with a minimum of work. Where cover is light and friable, some operators team up large bulldozers and 1½- to 3-yd diesel shovels to uncover the coal.

Increased capacity has been built into two-crawler shovels and draglines to permit removal of thicker overburden. These units require less working space and are especially adaptable to mining tracts where frequent moves are necessary. Shovels are available up to 10 yd in capacity and draglines up to 8 yd, and both may be powered either by electricity or diesel engines.

Spoil haulage is becoming increasingly important in anthracite stripping as depths increase. High-capacity, heavy-duty dump trucks are preferred for this job. When deep, hard overburden must be drilled, the dry-type rotary unit is gaining in favor. The horizontal side-wall unit still is used in many places where cover is less than 50 ft thick. Drilling patterns and proper placement of explosives in blastholes are receiving more attention in an effort to get better fragmentation with a minimum quantity of explosives. Delay shooting with MS delays also is contributing to better fragmentation with less vibration and complaints.

LARGE TRUCKS USED

Large trucks of both the tractor and end-dump types are preferred where high tonnage is mined. Tractor units carry 35- to 80-ton loads, while enddump units usually haul 10 to 35 tons. For maximum efficiency, coalloading units usually are matched to truck capacity.

Providing good services to all units is becoming increasingly important. Since today's strip mines have considerable capital invested in high-capacity units, down time must be kept to a minimum. To get maximum productivity with minimum effort emphasis is placed upon providing good service to the unit as quickly as possible.

Radio installations speed communications between the pit and the shop or foreman and, as a result, down time again is reduced. Special field-repair trucks are used to speed maintenance and keep units producing. Centralized lubrication of draglines and shovels is receiving acceptance as a method for constant lubrication of parts.





VERTICAL DRILLING, large-diameter blastholes, improved explosives, short-delay blasting all contribute to better fragmentation in overburden and eliminate secondary shooting, thus keeping high-capacity stripping units in useful work.

Modern, up-to-date methods in all phases of pit operations . . .





CLEANER COAL, directly to market or into the preparation plant, is secured through the use of units like these, which can double in other jobs to get the greatest benefits out of the labor and equipment dollars.





VERSATILE TRACTOR POWER finds application in a host of today's strip-mining jobs. Here they had scrapers to remove overburden and backfill worked-out areas. They also serve large shovels and assist in big-equipment moves.



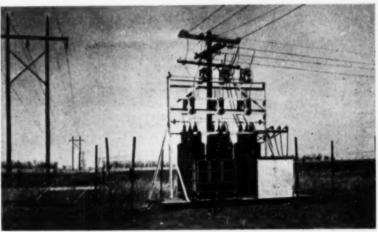


SERVICES ARE IMPORTANT—The eye-filling drainage flume and the somewhat-hidden parts supply room both have a part in eliminating delays from stripping and loading cycles. Wise investment in services helps over-all economy.

Well-designed services and planned maintenance for best performance



TWO-WAY RADIO, as modern as tomorrow, tightens operations, cuts costs,



MODERN POWER SYSTEMS are nerve and sinew of high-yardage, high-tonnage operations. High capacity and foolproof safety are built-in features.



PROVED IN PRACTICE One of nine units so far installed in Dosco Mines, this longwall miner, with head at top of cut, normally completes a wall 400 to 500 ft long and producing a ton per foot in 6 to 6½ hr. The coal is discharged to a face belt alongside the machine.

Continuous Unit Works a Pitching Longwall Face



MINER FACE after the machine has made a cut 5 ft wide and approximately $5\frac{1}{2}$ ft high. On this face, where the machine must be trammed back to the top of the wall, face support is provided by round bars hitched into the solid coal at one end and supported on posts at the other.

Longwalling With the Dosco Miner

With peaks of 573 tons per shift and 2,763 tons per week, the improved Dosco miner is regularly completing longwall faces 400 to 500 ft long on pitches up to 18 deg, yielding approximately 1 ton per foot with crews of six men.

HAVING SUCCESSFULLY COM-PLETED the initial steps in the mechanization of pitching longwall faces under deep cover, including the design of a continuous machine and the development of matching transportation equipment for use along the face, the Dominion Coal Co., Ltd., Sydney, N. S., is now in the process of adding new units as fast as machine production, installation and training of crews will permit. This reflects the ability of the longwalltype continuous miner developed by the company's staff, with a trained and experienced crew, to mine a longwall face 400 to 500 ft long and producing approximately a ton per foot consistently in less than a shift with a crew of six men, including the fore-

The machine on which Dosco bases its new mechanized-mining program is the Dosco miner, engineered by the Dominion Coal Co., Ltd., and manufactured under license from the Joy Mfg. Co., by Trenton Industries, Ltd., Trenton, N. S., another subsidiary of the Dominion Steel & Coal Co., Ltd. The original design (Coal Age, October, 1951) has been changed only in details since the first unit went into operation at No. 18 colliery, New Waterford, N. S., May 2, 1950.

Miner specifications include the following:

Design capacity-500 tons in an 8hr shift.

Peak production-8 to 10 tpm.

Width-4 ft 6 in. Cutting width-4 ft 9 in.

Cutting height, bottom to top-4 ft to 7 ft 3 in.

Height-3 ft 9% in.

Length-16 ft 9% in. Weight-19.9 tons.

Power-550 v, 3-phase, 60-cycle,

Cutting chains-150 hp.

Hydraulic system, 1,500 psi-30 hp. The miner has been operated on pitches up to 17½ deg. On inclinations of 12-to 18 deg, it cuts downhill only and is trammed back to the top of the wall to start a new cut. On lighter pitches it cuts both ways. Seven machines have been put in service to date, as follows:

Dominion No. 18 colliery—one, May, 1950; 17½ deg, downhill cutting only, tramming back to the top of the wall after each cut.

Dominion 1-B-two, February and December, 1952.

Dominion No. 20—two, May and September, 1952; 11%, cut both directions.

Dominion No. 12—two, April and June, 1953; 14 deg, downhill cutting only. The last unit in No. 12 was first displayed at the 1953 Coal Show of the American Mining Congress.

Peak performances achieved to date

Best shift-573 tons. Best week-2,763 tons.

MINER DESIGN

As shown in the accompanying illustrations, the Dosco miner is a crawler-mounted unit with a chaintype cutting head which is lifted through to coal by hydraulic cylin-The coal broken out of the face by the chains, equipped with Austin Hov Carbolov-tipped bits, is carried back to a reversible variablespeed cross belt, which shoots it out to a belt conveyor laid alongside the machine. Jacks at the back end of the machine may be used to lift the rear and thus drop the head to position it properly at the bottom before sumping starts. A plow underneath the cutting head keeps moving loose coal ahead as the machine advances so that it will be picked up by the chains.

Auxiliaries include two spray heads on each side of the rear end of the cutting head. Each spray head includes five nozzles-two of the fan type, two of the horizontal type and one of the cone type-to permit covering the entire head and face, including the sides as well as the top, and also to eatch the dust under the head. Each spray head includes a quickly removable reverse-flushing filter to prevent clogging of the nozzles and permit quick cleaning of the filter. Water pressure is 200 to 300 psi, and is treated with Compound M through an automatic proportioner mounted on the rear of the machine.

Sockets for jacking the machine in either direction, if necessary, are provided above the controls at the rear of the unit. A deflecting skid in 2-, 3-or 4-in sizes is provided at the rear of the unit for angling the machine slightly to keep it into the coal. The skid can be changed from one side to the other merely by taking out a pin and interchanging the skid with the light, also positioned at the rear.

Motor starters and switchgear are removed from the miner and are stationed at the foot of the wall, thus reducing bulk and weight and leaving only light pilot controls at the rear. Water hose and electric cables are sectionalized, the lengths of the sections being correlated with average trip loading. Thus, a 75-ft section (150 ft total advance) permits loading two trips, after which the loaded cars are hauled out and replaced with empties. During this period, the cables and hoses serving the unit are moved from one junction on the main lines paralleling the face to the next.

Head and chains have been redesigned so that any chain will work in any position. In the early units, chains had to be applied in specific locations and it was difficult to adjust for stretch and other changes.

The operating sequence with the Dosco miner is as follows:

Move machine to face and, if necessary, lift rear end with jack to put head in proper sumping position 3 to 5 sec.

Sump head 18 in into coal hydraulically 3 to 5 sec.

Lift head to top of cut.... 10 to 14 sec. Retract cutting head 18 in....

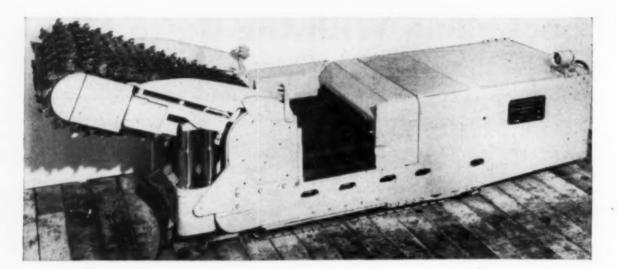
3 to 3 sec.

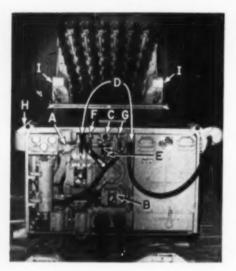
Lower head to bottom 3 to 3 sec.

Total 22 to 30 sec.

LONGWALL ORGANIZATION

Miner installations so far have been in the Harbour and Phelan seams in Dosco collieries on Cape Breton Island. These collieries normally extend out under the sea and production comes from three major seams in descending order—the Harbour (the Phelan, and the Gardiner, though others, usually less in thick-





MINER DESIGN-Front section, including cross belt, is advanced 18 in with head down. Head then is raised to the top by the jacks to complete the cut. A control setup being developed for automatic cycle is shown in photo at the left, as follows: A, master control in automatic position; B, flow control for automatic cycle; C, starter button for automatic cycle; D, crawler controls; E, rear lifting jacks; F, sumping; G, head lifting; H, skid to angle machine into face; I, spray heads. With the automatic cycle, operator merely moves machine ahead and adjusts rear jacks, if necessary. Then he presses a button and the cutting cycle, including retraction and lowering of head, is completed automatically. The time saving is estimated at 3 to 4 sec per cycle as a result of elimination of operator hesitation and fumbling, which is natural even with the most experienced men. A flow control supplements the automatic cycle to permit the operator to reduce hydraulic pressure and ease the load on the head when hard layers of coal are encountered. Should anything go wrong with the automatic gear, or should face conditions warrant, operation can be made manual by pushing over a lever to isolate the automatic attachments

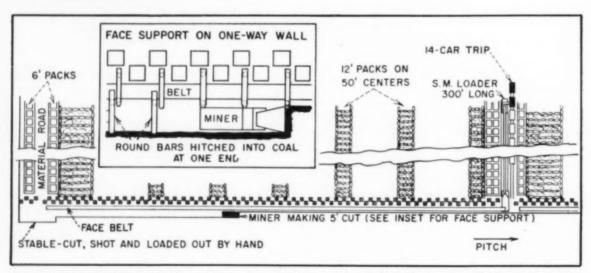


FIG. 1—DOSCO LONGWALL PLAN for continuous mining where pitches limit cutting to downhill only shows support by packwalls, chocks and bars behind the machine. System is the result of long experience under heavy cover.

ness, are present. The dip normally is 5% to 20 deg.

Thickness of the Harbour, so far the main site of miner work, is 6 to 6 ft 2 in. Normally, however, about 8 in of top coal is left in place to help support a weak shale overlying the seam.

As the mines extend out to sea, the depth of cover increases. Room-andpillar is worked in some areas, but Dosco experience shows that when the cover reaches approximately 1,200 ft the weight is such that pillars cannot be maintained without crushing. Consequently, longwall is the rule under heavy cover, and walls are worked advancing, from main slopes or deeps. This permits settlement of the cover after the initial level entries or laterals are made and the coal is extracted. Then the laterals are brushed and timbered with steel arches and lagging, after which, since the cover has subsided, they can be kept open indefinitely without disturbance or more than normal maintenance. Retreating longwall is less desirable because the laterals are more subjected to pressures and disturbance, in addition to other difficulties, particularly in the active

Roof control becomes an even more vital problem under such circumstances, and supports must be adequate and quite close to the face. Thus, for example, it becomes impracticable to move a face conveyor ahead as a unit because supports are required in front of the conveyor and cannot be removed. This influenced miner design and the way the unit is set up.

Principal equipment, aside from the miner itself is a face belt, a trip loader at the foot of the wall and, where the miner is worked down the pitch only, a cutter and other equipment for making stables at the top. Where the miner can work both ways, it cuts its own stables.

British-made Naylor belt conveyors are used alongside the miners to deliver coal to the trip loaders at the bottoms of the walls. Width is 30 in and the speed is 350 fpm, which provides sufficient capacity to accommodate surges of coal from the miner which, as previously noted, reach 8 to 10 tpm. The 50-hp drive is placed at the tail end, meaning the top of the wall, which has been found best for Dosco conditions. Because of the surges, a belt is the only practicable transporting device.

Since the conveyor must be broken up and moved up through the supports each cut, special consideration

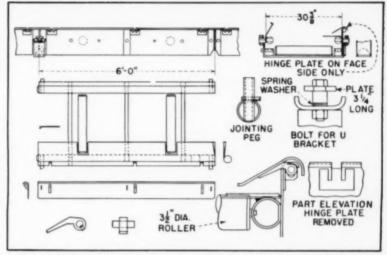


FIG. 2—FACE-CONVEYOR ADVANCEMENT is facilitated by a design that permits quick breaking up and reassembly and facilitates attaining alignment.

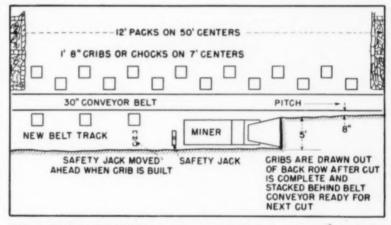


FIG. 3—TWO-WAY MINING permits support behind the miner by chocks installed as the machine advances. Safety jack is kept at the rear of the machine.

was given to speeding up the job, and also to facilitating alignment. sections are 6 ft long and are provided with side tubes for strength with lightness. The ends of the tubes fit into each other by means of tapered end sections and shoulders to facilitate alignment. Button-type fasteners need only be knocked a quarter-turn around to lock or release, and tubular members resting in U-shaped stirrups at the joints further facilitate alignment. Nevertheless, conveyors are set on sight lines on the roof each time they are

Both loaded and empty strands are flat, with skirt plates to confine the coal on the top, or loaded, strand. The skirt plates on the side next the face are designed so that they can be turned down toward the belt when coal is being discharged onto it. Below the loading point, they are in normal raised position. Load idlers are on 3-ft centers; return on 6-ft centers. The belts are applied in 75-ft lengths, using Hayden-Nilos fasteners.

The Sydney Mines loader, developed by Dosco and used at the foot of the wall, is a 300-ft-long belt-type unit with a chain-type feeder at the rear end to receive coal from the face belt. Sections are 9-ft long, with wheels at each point for advacing or retreating the unit on its own track by means of wire ropes extending to either the front or the rear from a winch powered by the conveyor drive through a clutch.

Pedestals elevate the conveyor to loading height at the outby end, where a 1½-ton hopper receives the coal and acts as a surge bin during car changes. A cross chain discharges the coal to cars on a parallel track. The length of 300 ft is sufficient to permit placing between 15 and 20 cars alongside. Car spotting and loader operation is controlled by an operator at the outby end.

LONGWALL OPERATION

The longwalling system to which the Dosco miner has been applied is, as previously noted, a result of long experience with operation under heavy cover. Faces 400 to 500 ft long are established straight up and down the pitch and packwalls, cribs and timbers are used to support the roof at the face and permit controlled subsidence behind the face.

All the coal is removed, as previously noted, starting near the slopes or deeps and working out. Level entries or laterals provide for haulage, ventilation, and access to the walls, and are established in two operations: (1) initial driving; (2) brushing, grading and permanent timbering for the life of the lateral after the coal face has advanced and the roof has subsided and is stabilized. Fig. 1 shows a typical miner wall where the pitch is such that the machine is trammed back to the top each cut.

The miner makes a cut 5 ft wide and, within the range of head design, as high as necessary, working from one end of the wall to the other. Since the miner is designed to cut straight ahead, it is necessary for it to start from a stable at the end of the wall each time. Where the pitch is low enough so that the machine can work both ways, the miner can cut its own stables by backing off when it reaches the end of the wall and then making a series of slanting cuts of the proper depth to form the stable. Where two walls are worked together, as is the case where possible, and the machines are working to the lateral at the middle, the first to reach the lateral cuts a stable and the second machine then enters it and keeps going. In other words, the two machines pass at the lateral and only one stable need be made at this point.

Where the pitch increases and the miners are trammed back to the tops of the walls, a new stable must be provided each cut. However, where two walls can be worked together, keeping the top one a cut ahead of the bottom makes it unnecessary to cut stables for the lower wall. To date, stables on steeply pitching walls are made by cutting, drilling, shooting and loading the coal to the face

conveyor by hand, using a separate crew, which also does other work when not engaged in stable preparation.

A plan by which the machine can cut its own stables is under consideration. Under this plan, when the machine reaches the top of the wall, it would head into the stable, or pocket, and advance it approximately 5 ft by successive cuts, discharging the coal to a portable conveyor for transfer to the face conveyor. This would require working across the pitch, but it has been found that there is no sideways sliding up to 18 deg, especially if a couple of short planks are used under the crawlers.

The operating crew of a Dosco miner is made up of six men: two operators, one of whom is a mechanic charged with checking on machine operation and condition in addition to alternating with the other operator every 1/2 hr or so; three timbermen, and one supervisor. All operators and mechanics are first trained at the manufacturing plant before actually going on duty with the machines. Thus, they know how the machines are made and function, in addition to getting grounded in preventive maintenance and machine care at the source

FACE SUPPORT

Two systems of running or face timbering are employed in accordance with whether the machine is working one way or two ways. In one-way, or downhill operation, in addition to two rows of chocks behind the conveyor, running support is provided by crossbars set at intervals of 4 ft and kept up to the machine. The crossbars are ordinary round posts. One end is rounded slightly with an axe and is placed in a hitch about 3 in deep, cut in the solid face with a pick. The other end is supported by a leg against the conveyor. The hitches provide good support without legs along the coal rib, and permit fast installation with security. This forepole type of support along the face is shown in an accompanying photograph. As the machine is trammed back, legs are set at the face ends of the bars as necessary for the next cut.

Where the machines can work both ways, running support is provided by chocks erected in front of the conveyor, as shown in Fig. 3. Mechanical chock releases are placed in the chocks to facilitate withdrawal. Where this system is used, a roof jack with a short bar is kept at the rear end of the miner to protect the oper-

ator. The effectiveness of the support systems and other safety measures can be gaged by the fact that there have been no compensable injuries on the Dosco miner faces at No. 18 colliery since the unit was first installed May 2, 1950.

WALL SCHEDULE

The aim in miner operation is to complete a 400- to 500-ft wall in approximately 6 hr or less. Thus, allowing for travel time, the wall is loaded off in a shift. In other words, since close support requires breaking up the face conveyor to move it up each time, the work must be carried on in a definite cycle.

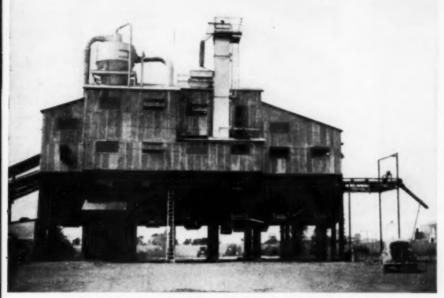
Upon completion of a cut, the operators, if the machine is working downhill only, start tramming back to the top of the wall. This normally takes from 1 hr to 1 hr 20 min. On the following shift, a second operator and also an operator-mechanic come in. If necessary, they complete the cut on the wall, and tram the machine back as necessary. Their principal duty, however, is to inspect and oil the machine, make adjustments and otherwise prepare it for the next shift's run.

Meanwhile, other men break up, move and reassemble the face conveyor, move the face timber up and otherwise ready the place for the next shift. If the operator and operator-mechanic complete machine preparation before the end of the shift, they join the other men in moving the conveyor and timbers and otherwise getting ready for the

next production period.

Advancement of the chocks or other face support also is accompanied by advancement of the pack walls which provide the main support and control subsidence behind the face. As the face advances, the roof first breaks up to 35 ft or so behind the face supports and later settles until it is stabilized on the packs and broken material from the initial cave.

On the maintenance side, the present schedule calls for complete overhaul of the Dosco miners every 3 mo. However, in the introductory period now ending, some machines have run as long as 6 to 15 mo with very little trouble-either mechanical or electrical. Where serious difficulties are encountered, it is possible to make major replacements on the face as a result of concentration on accessibility in design. For example, a main motor has been replaced by shooting a hole in the roof over the unit where it stopped on the face, lifting out the old motor and installing the new.



COMPLETE preparation facilities installed at the V-Day Coal Co, were selected to give customers a tailor-made product. New steel construction was superimposed on the old wood columns and bins.

Efficient Small-Plant Coal Cleaning

How V-Day Coal combines chloride washing and air tabling to upgrade all sizes. New steel structure built on old wood columns and bins cuts construction cost.

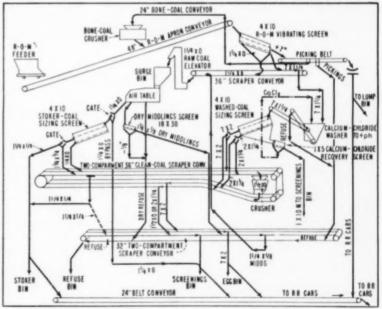
REPLACING old preparation facilities with new wet and dry facilities for cleaning all sizes, the V-Day Coal Co., Danville, Ill., has completed modernization of its preparation plant. After several years of successful operation immediately after the war, V-Day management saw additional possibilities in the Danville area for a well-prepared product and decided to capitalize on them.

To fully cash in on its opportunity, management first took into consideration customer needs when specifying equipment for the new plant. An important factor in equipment selection was the desire of a utility customer for a dry, clean, uniform product. Consequently, dry cleaning was selected for the slack sizes. Washed domestic sizes are sold directly to truck customers or loaded into railroad cars for shipment via the New York Central R.R.

The entire plant is designed for flexibility of operation with a minimum of personnel. Control of all plant units is from a central panel board. All units are interlocked and stopping and starting are in sequence. Coal flow is flexible to permit making various combinations of sizes according to customer needs.

Developed in the fall of 1945, V-Day since that time has furnished 500 tons of Illinois No. 6 coal per day to domestic and utility customers. After careful preliminary investigation in 1951, plans were completed early in 1952 to install complete preparation facilities consisting of a Kanawha-Belknap calcium - chloride washer for coarse coal and a Roberts & Schaefer Super-Airflow cleaner for the 1x1/4 size. Old facilities consisted of hand picking, crushing and screening units and products were plus 4-in lump, 2x4 egg and 14x0 slack. New construction began June 23, 1952, and was completed Sept. 10, 1952.

The plant was further altered in the summer of 1953 to permit rail shipment of all sizes. A 1/2-mi railroad extension was completed in August and the first rail shipment was made on Sept. 1. Minor changes in chutes and conveyors were made within the plant and a Lippman 77-ft 24-in belt conveyor was added at the east end of the building to deliver the clean product to either of two railroad tracks. An adjustable loading boom on the end of the belt conveyor permits loading with a minimum of degradation. Design and installation of the entire new cleaning facilities were handled by the Templeton-



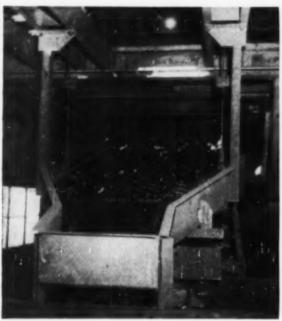
V-DAY FLOWSHEET-Wet and dry cleaning to upgrade all sizes.



APRON CONVEYOR conveys and elevates coal from bottom of raw-coal bin to top of new plant.



CHLORIDE WASHER separates 70 tph of raw 14x7 coal from the primary vibrator into clean coal and refuse.



WASHED COAL from the calcium-chloride unit is sized into 2x7 and $1\frac{1}{4}x^2$ fractions on this 4x10-ft vibrator.



AIR CLEANING of 11/4x0 provides the customer with a clean, dry product. Coarse 11/4x1/5 middlings are recirculated.





STOCKPILING of 1%x0 screenings is a team job for truck and loader. Truck hauls from bin to stockpile while loader fills voids and tops pile. One man of tipple crew is assigned to the stockpile.

Matthews Corp., Terre Haute, Ind.

To minimize the capital expenditure required, as much of the old structure and facilities as possible were used. The new steel addition was built on the old wood supports and existing bins. The result was a compact flexible plant in which there is no wasted space. Maintenance work is not handicapped by lack of work space as all units are readily accessible.

Coal is hoisted up a 24-deg 304-ft slope in 4-ton end-dump mine cars and dumped into a 100-ton storage bin. At the bottom of the bin a reciprocating feeder delivers 100 tons of raw coal per hour to a 48-in Link-Belt apron conveyor. This unit conveys and elevates raw coal to an Allis-Chalmers 4x10-ft double-deck Ripl-Flo vibrating screen that separates the coal into plus 7-in lump, 14x7 and 14x0. The lump coal flows to a picking belt where one man removes impurities and bony coal. Refuse passes directly to one compartment of a 2-compartment 32-in scraper conveyor which delivers it to a refuse bin. Bony coal is recirculated to a Jeffrey single-roll crusher and rescreened on the R-O-M vibrator. Clean 7-in lump discharges from the picking belt to a belt conveyor, which delivers it to the lump bin or to a 24-in belt conveyor discharging into railroad cars.

The 14x7 product is carried by scraper conveyor to the Kanawha-Belknap calcium-chloride washer. Sink material is combined with handpicked refuse before delivery to the refuse conveyor. Clean 14x7 from the washer is screened on a Robins 4x16-ft double-deck vibrating screen separating it into 2x7 and 14x2 fractions.

Underflow material passes to a Jettrey 12x60-in calcium-chloride recovery screen that recovers 1x10-mesh coal for delivery to the screenings bin and saves the chloride solution for recirculation to the washer.

Clean 2x7 and 1¼x2 may be loaded directly or diverted and crushed to 1½x0 in a two-stage double-roll Gundlach crusher.

Raw 14x0 from the R-O-M vibrator is elevated by bucket conveyor to a surge bin for delivery to the Super-Airflow cleaner. Products are clean dry 14x0, dry refuse and dry 14x0 middlings. Clean coal may be diverted to the screenings bin, railroad cars, or delivered to a Robins 4x10-ft vibrator that separates it into 11/4x1/4 and 1/4x0 products. The coarse product is delivered to the stoker bin and the fine to the screenings bin. Either of these products also may be loaded into railroad cars via the 77-ft 24-in belt. The larger product is recirculated to the air table while the 1/0x0 is diverted to a refuse bin.

Oil-treating facilities have been incorporated in the new plant so that coal may be treated according to the customer needs.

Five men perform all the duties around the plant and on the surface. Classification is as follows:

100331110	ation	1 13	435	3 1	10	110	111	13					
Slate	pick	ers	*							*	*	*	1
Mech	anie							*		*	*		1
Paylo													
Hoist	ope	rat	or										1

A truck and Hough Payloader are used to stockpile screenings for a utility customer. Refuse disposal also is handled by the truck. Approximately 5,000 tons of screenings are stored

Total ..



V-DAY SPARKPLUG, co-owner and manager of operations, Arthur Zamberletti, has many years of experience.

at the mine since the customer's power plant has insufficient storage space. Large trucks haul the slack coal to the power plant as needed. Plus 7-in lump and 2x7 furnace lump are sold directly to truck customers or shipped via railroad.

MINING IN THE NO. 6 SEAM

Mining at V-Day is in the Illinois No. 6 seam which averages 72 in. The roof is friable gray shale and the bottom is hard shale. The mine is classed as nongaseous. At present, operations are on a one-shift basis with shooting done on shift with Armstrong compressed air at 11,000 psi. Twenty-two men perform all underground work and tons per man on the payroll average consistently over 13.

Section equipment consists of a Joy 14-BU loading machine that loads directly into 4-ton end-dump mine cars. A Goodman 360 loader is kept on the section as a spare. Coal is cut with a track-mounted Sullivan 7AU machine equipped with a 9-ft bar, Cincinnati Duplex chain and Cincinnati bits. Roof-bolting equipment consists of a Joy stoper and air compressor. The compressor is mounted on a Sullivan 7CE cutting-machine truck powered by a 10-hp motor. All section equipment is 220-v AC.

Section haulage is handled by two 7-ton General Electric battery locomotives, while one 6½-ton Ironton unit hauls coal to the slope bottom. Track gage is 42 in and the track is laid with 40-lb rail.

Ventilation is provided by a 5-ft Guyan Machinery fan delivering 30,000 cfm to the mine workings. A 125-ft air shaft is lined with 8-ft diameter Armco tunnel liner and has a spiral staircase for emergency use.

Entries are driven 12 ft wide on 30-ft centers in a group of five, with breakthroughs driven on 45 deg. Rooms, 25 ft wide and on 38-ft centers, are driven to depth of 300 ft on both sides of panel entries and pillars are not recovered.

Roof-bolting along with safety-conscious management has made it possible for V-Day to have a successful opeartion. Roof bolts, ¾ in in diameter and 4 ft long, are installed in all working places. Two rows of straight timbers, one row along each rib, supplement the bolts in the room work. Roof conditions in the No. 6 seam are extremely bad in the Danville area. Management points out that roof-bolting has helped the company compile an excellent safety record. The owner has produced over one million tons of coal without a fatal accident.



TYPICAL modern electrical controls include pushbutton sequence starting. One panel board controls whole plant.



IN THE R. G. HEERS, manager of mines at Sunnyside, has all the information he needs for effective administration literally at his fingertips with the new dial telephone system in operation. By dialing he can make instant connection to any of the 69 other phones on the property, 46 underground and 23 in surface facilities.



IN THE G. A. FARNSWORTH, mine superintendent, Sunnyside No. 1, can keep in touch with the entire operation through direct phone contact. Clarity of reception is a major operating advantage of the system, mine officials say.

How Sunnyside up-dates its communications with . . .

Dial Telephones Underground

Modern mining, with the accent on rapid extraction and concentrated production, demands streamlined communications. That's why officials at Sunnyside, Kaiser Steel Corp., turned to their local telephone company for help.

WERE YOU OF A MIND TO DO SO—and if R. G. Heers, manager of Sunnyside mines, Kaiser Steel Corp., Sunnyside, Utah, would approve your flight of fancy as a legitimate expense item—you could telephone New York, Chicago or any other town in the country from deep in the workings at Sunnyside. You would merely dial the operator and give her the desired number.

That's right! Sunnyside has converted to the dial telephone system and is tied right in with the national telephone network.

That's a dramatic view of what can be done with the newest innovation at Sunnyside, but mine officials take a more down-to-earth look at the benefits which may be confidently expected. They figure the best in communications is none too good for a modern mine that is growing every day. The pace is too fast to tolerate smoke signals, couriers or the old party-line phones in the communications setup.

One of the big advantages, the officials say, is the clarity of reception in the new system. With the old party-line system, conversations were next to inaudible and were constantly interrupted, making it difficult to convey ideas with certainty. The lines were getting too long.

The Sunnyside property employs 70 telephone sets, 46 underground and 24 in surface facilities. Six trunk lines connect the mine system with the central office of the Mountain States Telephone Co. in nearby Dragerton, thus making it possible for six outside calls to issue from the Sunnyside property simultaneously.

Within the property, calls are placed merely by dialing the number of the desired extension, and a mine directory has been prepared to make this an easy matter. To make an outside call from many of the Sunnyside phones, it is only necessary to dial "9," wait for the dial tone, then dial the outside number; that is, on local calls. On toll calls, of course, you've got to contend with the telephone-company operator, like anywhere else.

A switchboard is located in the main office through which incoming calls may be channeled to the proper extension set and through which outgoing calls from three dial-reverting lines on the property are controlled. There is a control, you see, on most of the calls leaving the property. On dial-reverting lines, you've got to get past the Sunnyside operator in the main office.

Here's how the change to dial phones came about, Mr. Heers says. Two enterprising sales engineers from the Provo, Utah, office of the Mountain States Telephone Co. followed up on the idea and made further investigations which finally led to a serious conference with Sunnyside officials on the mechanics and cost of making the change.

The area in which the Sunnyside mines are located was converted to automatic dial equipment in 1951. At the time plans were being made by the Mountain States Telephone & Telegraph Co., their representatives contacted each company and resident in the area to determine the type and extent of service desired. It was at this time that Kaiser Steel requested that the telephone system be extended into the mine.

It was decided that the telephone company would provide all the equipment, with the exception of the underground cables, on the conventional rental basis and that the mine electricians would make the installation since the telephone company technicians were not accustomed to such unusual installations. Accordingly, a carrier cable and telephone cable were suspended as necessary from the mine roof, and weatherproof sets enclosed in dripproof boxes were placed at main partings, dispatcher stations, working sections, engine rooms, shops and so on.

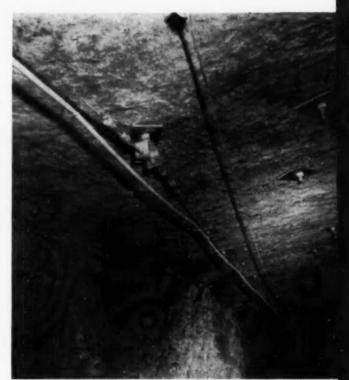
The nerve center, including the necessary relays, electronic equipment and storage batteries, occupies space in a separate small building adjacent to the main mine office on the surface. The storage batteries double as a standby source of power in addition to providing direct current for some of the switching equipment.

Maintenance is based upon the unit-replacement system. If a set gets out of order, the whole unit is removed and replaced by a new one. Then the inoperative one is sent to the telephone company for repair. Sunnyside's only other responsibility is paying the bill.

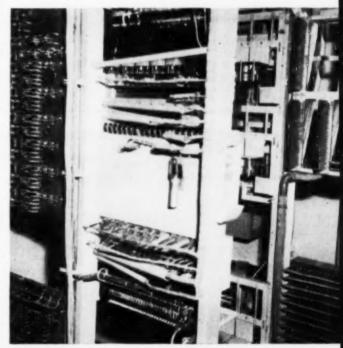
Mine officials agree that in a business that has been plagued for so long by hidden costs, it will be nice to contemplate perhaps some hidden benefits for a change.

It is expected that better communications will result in quicker clearance of machine outages, smoother haulage dispatching for both coal and mining materials, faster organization in emergencies and tighter co-ordination in over-all operations. Early experience indicates these benefits will be realized.

The new telephone system is one more step in Sunny-side's program of modernization which includes a revamped ventilating system, a new main haulage line, an enlarged preparation plant, complete mechanization, and the addition of new housing in the town of Sunnyside. The goal is to increase production to 7,600 tons daily from the three mines included in the property (see "Rebuilding Sunnyside," Coal Age, May, 1953, p 114, for a detailed description of the program).



CARRIER CABLE, suspended from roof-bolt hangers, supports the telephone cable. The installation was made by mine electricians.



NERVE CENTER of the system, including switching equipment and storage batteries, is housed in a separate building near the office. Telephone-company technicians maintain this complex array for the coal company.



EFFECTIVENESS of new safety device is demonstrated by Fred Helter, mine operator, as J. H. Cox, inventor (right), looks on. In a test, the fully loaded belt was intentionally separated at a splice and moved only 11 in before it stopped.

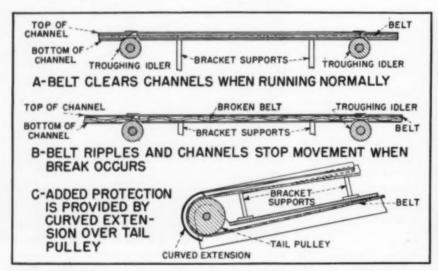
Preventing Belt Runaways

How a new safety device installed at an Ohio mine prevents belt runaways resulting from belt failures

POSITIVE PROTECTION against belt runaways resulting from breaks is provided by a new patented protective device in service at the Helter Coal Co., Uhrichsville, Ohio. Featuring simplicity of construction, dependability and adaptability, the new device is the result of 15 yr of experimental work by John H. Cox, of Tuscarawas, Ohio. The inventor operates a mine near his home and has several other inventions to his credit. He is constantly experimenting with ideas for new gadgets or devices that might be useful around the mine.

The protective device consists of two parts: (1) two sets of U-shaped channels supported by brackets on top of the conveyor frame; and (2) curved extensions reaching almost half way around the tail pulley a fixed distance away from the belt for additional protection. The new unit, patented March 17, 1953, is available to the mining industry through The Nolan Co., Bowerston, Ohio, who entered into a manufacturing agreement with the inventor shortly after it was perfected.

The channels are mounted on opposite sides of the belt so that it can move freely within them when it is operating normally. If the belt breaks,



UNBROKEN belt clears walls of channels (A). When break occurs, belt wrinkles (B). Curved extension (C) around tail pulley provides added protection.



INVENTOR of the protective device is J. H. Cox.

the tension is released and the belt ripples and wedges in the channels and is held in place, thus preventing it from running back and piling up at the tailpiece.

To test the effectiveness of the new unit, the fully loaded 30-in belt, installed on a 17½-deg slope, was stopped and a splice was separated. Engagement of the belt was almost instantaneous and the total separation of the splice was only 11 in. Most of the separation was the result of the slight belt movement that is necessary to create the ripple in the belt which comes in contact with the channels and stops motion completely.

The distance between the upper and lower walls of the channel sections is a key factor in successful operation of the device. When the belt is not broken, it travels smoothly without contacting the sides. But when it is broken, the weight of the belt and coal causes the belt to ripple and come in contact with the walls of the channels, and a runaway is prevented.

While the safety device is basically the U-shaped channels, it may be combined with steel sideboards to prevent spillage of coal along the belt line. The channels and sideboards are available as a combination one-piece item or the sideboards may be attached with bolts. Mr. Helter, who has the one-piece type at his operation, states that the prevention of spillage alone is worth the price of the entire device.

Channels and sideboards are made of ½-in sheet steel and are joined by spot welds when a one-piece unit is desired. Support for the safety device is provided by 2-in steel-tube brackets bolted to the top of the conveyor intermediate sections. Each section of the protective unit has four supports connected to the conveyor at points adjacent to troughing idlers. Tops of channel sections overlap and are bolted together while the lower walls are beveled at the ends to provide recesses to accommodate rollers.

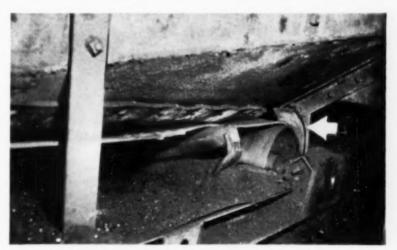
Over the course of 15 yr, while seeking a positive method to halt costly belt runaways, Mr. Cox experimented with many things ranging from a reversing mechanism on the conveyor rollers to electrical gadgets. All of these failed to solve the problem of runaways. The inventor points out that there are no restrictions as to length or size of conveyors on which the device can be used nor on the angle of inclination. For this reason, the inventor feels that the device will be applicable to preparation plants where belt-mounted bucket elevators are used.



CHANNEL SECTIONS are mounted on brackets bolted to conveyor. Tops overlap and are bolt connected; lower walls are beveled.



DESIGN of combined safety unit and sideboards is shown by end view. Belt has ample clearance and does not touch channels when operating normally,



CURVED SECTIONS at each end of tail pulley provide additional protection.

Distance between sections and belt is key factor.



NEW FAN, elevator headhouse over shaft and service building at Crichton No. 4 mine. Modern facilities were PORTAL designed and located to reduce handling time for both men and supplies.

Relocated Portal Saves Travel

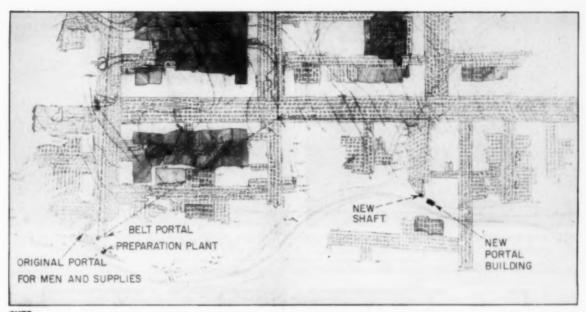
Placed near the center of the remaining coal, new portal facilities at Crichton No. 4 include an 80-ft 2-compartment shaft, 50-man automatic elevator, 5-ft fan and modern building for mine service.

A TRAVEL-TIME SAVING of nearly half an hour for at least half of the mine sections and a reduction in cost of transporting supplies are the direct and tangible advantages of a new shaft and portal at Crichton No. 4 mine of the Johnstown Coal & Coke Co., Nettie, Nicholas County, W. Va.





BIG DOOR at near end of the service building accommodates trucks handling rock dust. Bathhouse is in the higheaves center section. Lamp men, one per shift, take care of the 325 lamps, clean the bathhouse, and launder the towels.



THE NEW SHAFT and portal are close to the center of the remaining coal in Crichton No. 4 mine, currently producing 2,500 tons of cleaned and prepared coal per day.

For Both Men and Supplies

The new facilities also include a new fan, a 50-man capacity automatic elevator and a service building which includes a laundry for towels.

Crichton No. 4 is one of six mines of the Johnstown Coal & Coke Co., which operates in Pennsylvania and West Virginia and is headed by Harry A. Crichton, president. J. N. Crichton is vice president operations; C. N. Crichton, vice president-treasurer; and G. T. Crichton, vice president sales. The mine, in 42-in Sewell coal and opened in 1944, has belt haulage from the sections to a drift portal at tipple elevation. All equipment is powered

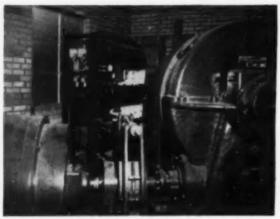
by AC and the face voltage is 440. Men and materials are transported underground by battery-powered tractors or shuttle cars. The mine operates 2 shifts, is equipped with a 5-track tipple including a Belknap washery, and produces 2,500 tons of cleaned and prepared coal per day.



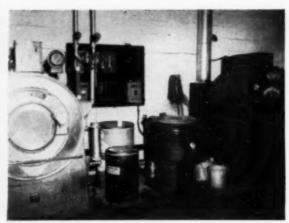
CANOPY COVERS THE DOOR through which the men enter the automatic push-button-controlled elevator.



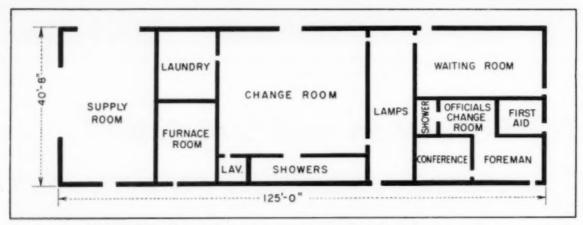
ON THE WAY OUT, P. W. Galeener, superintendent, pushes the button to close the doors and start the elevator.



ALL KNOWN SAFETY DEVICES are installed on the traction-type elevator rated at 50-man capacity.



LAUNDRY ROOM has washer (left), extractor and drier.
Only towels are washed in this laundry.



FLOOR PLAN of the Crichton No. 4 service building for men, officials and supplies.

The new shaft, 80 ft deep and concrete lined, is located 1 mi up Panther Creek from the tipple, shop, mine office building and from the drift portal used until recently for men and supplies. A 7x16-ft compartment of the shaft serves as an upcast for the fan and a 12x16-ft compartment accommodates an elevator cage of that same size. At the bottom of this shaft, passageways totaling 795 lineal ft were brushed to an average height of 66 in and protected against spalling by 14-in of Gunite, except for the battery-charging room which was reinforced with wire mesh and given a 2-in coating (Coal Age, Sept., 1952).

The elevator, made by the Houghton Elevator Co., Toledo, is a traction-type unit with automatic push-button control and all the known safety devices. No operator is employed except when the shifts go in and out. At all other times the rider operates the elevator. The man who operates it during shift changes makes safety inspections of elevator equipment,

checks the number of men per trip and searches for matches and cigarettes. Although the manufacturer rates the elevator at a 50-man capacity with a large factor of safety, the West Virginia mine law limits loads to 15 men, another case where inflexibility limits the savings a coal operator can realize from an investment in modern equipment.

The fan is a 5-ft Jeffrey Aerodyne, Type 8H60.

Dimensions of the service building, of cinder-block and completely fire-proof construction, are 40 ft 8 in by 125 ft (outside). The building is in three sections. Eaves height is highest on the center section, which is the bathhouse. Next lower is an end section housing the laundry, furnace room and supply room which is used principally for rock dust and is equipped with doors high enough to accommodate trucks. The end section closest to the shaft has the lowest eaves and provides rooms for lamps, waiting, first aid, general mine fore-

men's office, office showers and change and conference quarters.

The change room of the bathhouse has 300 hanger baskets. On the change-room wall and next to the door leading to the shower room are single wash basins. Furnishing of towels and the laundering thereof is included in the small fee the men pay for use of the bathhouse. The laundry room opening off the change room has the following machines furnished by the American Laundry Machinery Co.: Cascade washer, solid curb extractor and Zone-Air drier. One man on each of 3 shifts takes care of the lamproom and bathhouse, fires the boiler, operates the laundry and does general clean-up.

Lamp equipment consists of 325 Edison Model R4 four-cell units supplied by the Mine Safety Appliances Co., charged at 1.8 amp for 6 hr.

Across the creek and within 100 yd of the service building, a large parking lot has been graded and provided with night lighting.

get **EXT** savings easy cutting with **KENNAMETAL***

At a large colliery in West Virginia, one set of Kennametal U8R3 Bits cut 1440 30-ft. places at a bit cost of only \$.0013 per ton. Previous costs here had been reasonable because of relatively easy cutting conditions, yet use of tough Kennametal Bits not only reduced these costs, but produced better coal, with less dust.

Controller repair costs are down 50% ... power consumption is 15% less . . . cutting time per place has been reduced by 20 minutes . . . cuttings are coarser — there is more pea coal.

Kennametal Bits - the economical answer to severe cutting problems — can also effect extra savings in ordinary cutting conditions because they stay sharp longer, take harder knocks than any other tungsten carbide. Your Kennametal Representative would like to go into your mine and demonstrate. Call him anytime.



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World's Largest Manufacturer of Tungsten-Carbide

Drill Bits, Cutter Bits, Roof Bits, Strip Bits

Foremen's Forum



A GOING COAL MINE is a team proposition. So is a heads-up unit section, Good supervision, grounded in the fundamentals of leadership, is a hallmark of such mines and sections, Co-operative employees mark this kind of supervision.

Good Manners: Key to Supervisory Success

The good mine supervisor . . .

- 1. Centers his supervision on his employees
- 2. Accepts and executes top-management policies
- 3. Believes and observes sensible rules of courtesy

HUMAN RELATIONS and human engineering are a pair of terms which have been examined and discussed ever since the relationships between industrial labor and management became a big factor in our society. Let's have another go at it, with the aim of pinning down some of the elusive concepts contributing to good supervisor-employee teamwork. And to provide coherence in the discussion, let's confine ourselves to searching out answers to these three questions:

- Where should supervisory emphasis be centered—on the employee or on production?
- 2. Does a good top-management personnel policy invariably result in good company-employee feeling throughout the organization?
- 3. Does courtesy have a place in daily contacts between foreman and worker?

1. EMPLOYEE-CENTERED SUPERVISION

Recent studies of a large number of different industries indicate that we may be missing a bet on this matter of incentives. Actually, though, when you take time to think about these things, the results of the study are not so startling. Here's what happened.

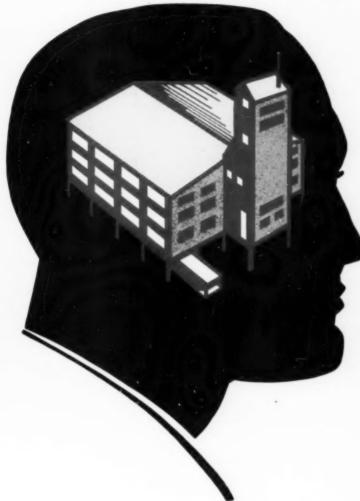
Dr. Rensis Likert, director, Institute for Social Research, University of Michigan, set out to find the principles of company structure and the principles and practices of leadership that are responsible for high productivity and high job satisfaction. Employees in a number of industries and business offices were interviewed and the operations of these organizations were closely observed.

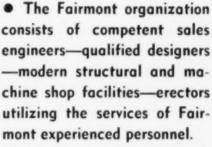
Dr. Likert drew the conclusions that:

THERE'S ONLY ONE CONTRACTOR'S RESPONSIBILITY

When it's a

"FAIRMONT BUILT"





Thus, the complete responsibility for efficient operation—low maintenance cost—and uniformity of product is vested in the Fairmont organization which guarantees cleaning results.

You can make your coal a better, more marketable product —meet consumers specific requirements—and arrive at a more profitable operation with a "Fairmont Built" plant.

Experienced sales engineers will be pleased to help you solve your coal preparation problems.



Fairmont, West Virginia

Designers and Constructors of Complete Coal Preparation Plants Using Both Wet and Dry Cleaning, Centrifugal and Thermal Drying.

- 1. Many current managerial and supervisory practices are based upon less-effective theories of motivation and fail to use fully the motivational resources inherent in human nature.
- 2. The same practices that work in getting high productivity also seem to produce less absenteeism and high job satisfaction.
- Financial incentives, above and beyond wages, appear to be over-rated as a means of increasing productivity.
- Direct pressure from management for high production doesn't always achieve that desirable goal—more output per man-day.

Does Dr. Likert have any suggestions as to what supervisory methods can be used effectively to increase productivity, reduce absenteeism and promote job satisfaction? He has. They are as follows:

- 1. High production and job satisfaction seem to result from supervision that is not close, that is employee-centered, that offers active leadership and that encourages team spirit. In coal mining, it must be recognized of course that safety demands a large measure of close supervision, but when it comes to producing coal it should not be necessary for the supervisor to take his men by the hand, so to speak.
- 2. High-producing supervisors tend to have greater authority and freedom of action than low-producing supervisors, and in turn delegate more to their workmen. Direct pressure for production is associated with low productivity.
- 3. "Employee-centered" supervision is associated with high production. In contrast to "production-centered" supervisors, employee-centered bosses see themselves as representatives of their employees, see their jobs as concerned with personal and group leadership, have a better understanding of the problems of employees and treat their employees as individuals rather than as cogs in a machine.
- 4. High-productivity supervisors are less punitive when their men make a mistake and they spend more time training their men for their present work and for the next higher job. Although more employee-centered, these supervisors also recognize and accept their responsibility for production.

High-producing supervisors stick to their role of leadership. They are more likely to supervise their workers as a group rather than as individuals.

Those are nine points turned up by the study. They bear out the proposition that the mantle of leadership must be earned by the boss, it is never conferred upon him by his men without good and compelling reasons. The "leader" type of mine supervisor is a forward-looking, positive individual. He

knows what must be done, he has a plan for doing it and he realizes that machines and methods are auxiliary to his men, not vice versa. That's the nub of employee - centered supervision. High production usually is a natural consequence of such expert leadership.

2. PROMOTING GOOD PERSONNEL POLICIES

Top management in progressive companies fully realizes its responsibility for setting up the best possible policies for hiring, training and paying employees, and for keeping them informed of what the company is doing and how it is getting along with the job. But making policy is one thing and the execution of that policy is another. Top management must depend upon line supervisors for proper execution of the policy.

Taking a fast look at this situation, most of us would assume that good personnel policies, formulated by top management would automatically filter throughout the entire organization. However, it doesn't always work that way.

A recent issue of Factory, a McGraw-Hill publication, carries a shocker. It is the story of how a company assigned a newly-employed staff trainee to a tour of duty in various departments of the company. This is a company with top-notch personnel policies. The new trainee was to learn as much as he could, and of course he was to turn in a report of his experiences at the end of his training tour.

What a report! And remember, it was written within a company that was considered to be generally on the ball. Here are excerpts:

- 1, "... I received no instructions before starting work although I replied negatively to a question about whether I had operated a hand-truck before..."
- 2. "... On the first trip the truck fell between two steel ramps which appeared solid. It took three men to right the truck. Another new man following me made the same mistake with the result his load spilled completely. Afterward we were told which ramp to use..."
- 3. "... Although the safety contest was mentioned, we received few, if any, suggestions on how to avoid accidents..."
- 4. "... Our foreman never told us what to do next, so we followed him around ..."
- 5. "... Indoctrination by the plant manager is excellent. It fills a definite need and has the advantage of showing the men top management is interested in them ... and in building esprit de corps ..."

6. " . . . I have not seen a [safety] poster changed since my arrival . . ."

There were a number of favorable comments, like 5 above, but most of these referred to top-management policies such as health insurance plan. Most of the slip-ups appear to be on the first-line supervisory level

line supervisory level.

The obvious solution requires better communications down through management and improved execution by immediate supervisors of those good policies adopted by top management. It merely proves that top management may have the best intentions in the world, but such good intentions are limited if the immediate supervisors of the men fail to follow through. Don't penalize the company by short-circuiting its most important policies.

3. SUPERVISORY COURTESY: WHAT IT IS . . . WHAT IT DOES . . .

By courtesy, we don't mean bootlicking or bowing-and-scraping. At the outset it might be well to make the point that you can't please everybody all the time. You haven't supervised until you've made a decision that rubs some individual or group the wrong way. Even situations like these, however, can be handled courteously.

Here are some examples of supervisory courtesy in action:

- 1. Handle complaints with as much speed as possible. The man who made the complaint is patiently, perhaps anxiously, awaiting an answer. This is an important matter to him, even though he only thinks he has a complaint.
- 2. Keep all confidences to yourself. Don't blab. The sound of a male gossip in action makes the flesh of most men creep. The blabbermouth always in penalized for this breach of courtesy in that he loses the confidence of his men.
- 3. Don't use the fears and worries of your men against them. That's dirty pool. You can usually make your point by stating facts, not threats. For example, never threaten a man with loss of employment. If he has himself in the shadow of discharge, a warning based on fact may straighten him out.
- 4. Don't consider any man as a "problem" employee. There are no problem men, there are only men with problems. You can't be a wet nurse, but you must keep your mind open to the possibility of making valued employees out of your men-with-problems.

5. If you must argue, hold your temper. The fellow with more sense is more to blame for an uncontrolled argument.

There it is. The supervisory techniques we so often place in the platitude class are the ones which really get the work done with least pain and strain. This is 1953, almost 1954. In these days none of us can bully his way through a job because too many of the rest of us have been through high school or its equivalent. Nowadays, everybody knows which end is up, so the boss who operates in a fair and square manner takes the prize. And that's the nub of supervisory courtesy.



"CAT" MACHINES DO OUR JOB BEST"

C. A. KELLY, SUPERINTENDENT Colonial Coal Mining Co.

"We're almost 100% standardized on Caterpillar machines, and are completely satisfied. They do our job best," says C. A. Kelly, superintendent of Colonial Coal Mining Co. of Madisonville, Ky. This strip mine owns four D8s and five D7s. One of the D7s, a veteran of over 14,000 hours, is still doing a drilling job. Two of the D8s have almost 7000 hours of hard service. A D8 is shown here with Jaeger compressor and drill jumbo. It averages about 800 feet per day through lime rock.

Caterpillar equipment stays on the job the year around at many mines, where operators winterize by standardizing on Caterpillar machines. These husky yellow units have stamina to work in frozen materials, and balance and traction to keep going when the footing gets tricky. Quick-starting Caterpillar-built Diesel Tractors need no pampering, even in coldest weather. With this equipment, you work as far into the winter as you want to—and then get off to an early start again in the spring.

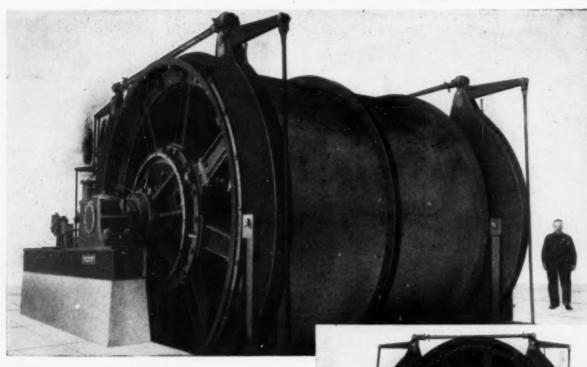
Standardizing on Caterpillar products pays off, too, in operator familiarity, ease of maintenance, and one-stop dealer service. Because these machines are noted for long, trouble-free work life, they return you years of profit—and bring premium trade-ins.

Your Caterpillar Dealer sells a wide range of tractors and matching bulldozers. He will arrange an onthe-job demonstration of the Cat-built unit that suits your job. Call him today.

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

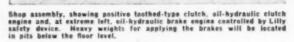
NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE

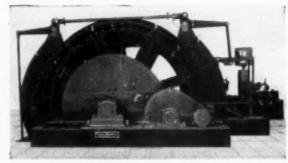


BIG . . . but still fast . . . safe . . . dependable

This huge electric mine hoist embodies every approved advantage for fast, safe, hoisting in a shaft 800 meters deep. Designed primarily for balanced hoisting of men and materials from several different levels, it will be used also, at times, for hoisting ore. Vulcan double-deck cages and "Allcasteel" sheaves were furnished for the same installation.

Each of the two all-steel built-up cylindrical drums is 18'-0" in diam. by 8'-1" in width with accuratelymachined helical grooves for stowing approximately 2800 feet of $1\frac{1}{2}$ " rope in one layer. The "loose" drum is equipped with a positive toothed-type clutch. Parallel-motion post-type brakes on each drum are equipped with pressure-graduating rigs and controlled by dependable safety devices which apply the brakes automatically in event of power-failure, overspeed or overtravel. Brakes and clutch are both operated by oil-hydraulic engines and, on the loose drum, are mechanically and electrically interlocked. Other superior features, here illustrated and described, combine to assure the dependable troublefree service that has made Vulcan hoists the standard of the mining world for more than a hundred years. Correspondence is invited regarding any requirement for heavy-duty hoists, sheaves, cages, skips, etc. Il-Instrated bulletins mailed promptly on request.





Shop assembly, showing oil-tight welded-steel casings for double-reduction herringbone gears, through which the hoist will be driven by a 500 hp, wound-roter induction motor. Main shaft and both pinion shafts are mounted on self-aligning spherical roller bearings. Other modern features include a Trip Recorder, a Recording Tachometer and a Centralized-Control Desk on the floor level.

KES-BARRE, PA., Established

DESIGNERS AND BUILDERS OF ELECTRIC HOISTS, "ALLCASTSTEEL" SHEAVES, CAGES, SKIPS, GUNBOATS, ETC., UNDERGROUND CONVEYORS AND ALL TYPES OF LOCOMOTIVES FOR BOTH UNDERGROUND AND SURFACE HAULAGE

1849

50 Church Street



The statement above comes from Mr. D. W. Aten, vice-president of Maumee Collieries Company. Concerning his company's successful operation of several large strip pit mines in Central Indiana, Mr. Aten reports:

"We have a variety of equipment from light cars and trucks up to 25-ton dump trucks, 40-ton tractor trailer dump units, and heavy tractor bulldozers. These units work the year around, and in all types of weather. Under these conditions our equipment must be able to take punishment. Mr. Joe Burcham, our Haulage Superintendent, reports that Standube HD-M Motor Oil has protected our engines under these rugged operating conditions, and that our engines have remained clean and given trouble-free operation. These have been important factors in serving our customers' coal needs by enabling us to keep production up and maintenance costs at a minimum."

Make the experience of the Maumee Collieries Company the basis for discussing your lubrication needs with your Standard Oil lubrication specialist. This man is

located near your mine and has the products and the lubrication engineering "know-how" to help you get more effective lubrication of your mining equipment. For his services, phone your local Standard Oil office. Or, write: Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Illinois.

STANOLUBE HD-M

R. E. Murrahan, of Standard Oil's Evansville, Indiana, office, has worked closely with the Maumee Collieries Company to help them obtain maximum benefits from STANOLUBE HD-M Motor Oil and other Standard Oil products.

R. E. Murnahan is one of a corps of Standard Oil lubrication specialists located throughout the Midwest. One of these men serves your immediate area. Because of his special training and wide experience, he is thoroughly familiar with the lubrication needs of your mining equipment. You can reach him quickly and easily by phoning your local Standard Oil office.

STANDARD OIL COMPANY STANDARD

STANDARD

(Indiana)

The second of two articles on profits

What Are PROFITS Used For?

This is the second article on the role of profits in our economy. The first was addressed to the question: "How High are Profits?" The answer was found to be: not high when compared with previous years and the present investment in corporate facilities. This second article is addressed to the equally important question: "What do corporations do with their profits?"

In 1953 corporations will earn about \$20 billion after taxes, if the recent rate of earnings is maintained throughout the year. These profits will be used (1) to expand and improve productive capacity through purchases of new plant and equipment, (2) to finance the operations involved in a growing volume of business and (3) to reward the people who have invested their money in American industry. Of the \$20 billion, the corporations will pay about \$9 billion to their stockholders as dividends. They will use the \$11 billion that remains to purchase new plant and equipment and to increase their working capital.

This year corporations are increasing their plant, equipment and working capital by a total of approximately \$32 billion. Of this amount, about \$26 billion is for new plant and equipment. The remainder is for working capital. As this

article will show in greater detail, about \$21 billion of this will come from depreciation allowances and sales of new securities. The other \$11 billion will come from retained profits.

It is impossible to trace exactly how each dollar of retained profits is spent. This money is mixed with other money that goes into the company treasury in the form of proceeds from loans, sale of securities and depreciation allowances. However, it is a fact that by retaining \$11 billion of their profits this year, corporations have provided \$11 billion toward their total capital requirements, including the money needed for expanded and improved capital equipment.

Profits Mean New Plants

This year American industry is engaged in a very large expansion of plant facilities. This will increase the industrial capacity of the nation by about 7 per cent. Since 1950, our capacity has been increased by about 12.5 per cent. And all of this expansion has been privately financed, even though about one-third of it was certified as necessary for national defense.

The expenditure during 1953 of \$26

billion for new plant and equipment - an alltime record-imposes terrific financial responsibilities on our corporations. About one-half of the amount required will come from depreciation allowances. In general, these allowances are supposed to pay for the replacement of worn-out or obsolete equipment. Another \$8 billion will be raised by corporations through new security issues and long-term mortgage loans. All together, depreciation allowances, security issues and long-term loans will provide about \$21 billion. But this is still \$5 billion short of the \$26 billion needed for new plant and equipment this year. Thus, it is retained profits that spell the difference between expansion and standing still, between growth in the productive capacity of the economy and running downhill.

As plant facilities are expanded, corporations also need more working capital. A larger volume of business requires larger inventories, larger accounts receivable and larger amounts of ready cash to meet payrolls and bills for materials. The increase in these items during 1953 is estimated at \$8.5 billion, of which about \$2.5 billion will be supplied by short-term bank loans. The other \$6 billion will come from retained profits. Thus, retained profits provide an essential \$11 billion - \$6 billion for working capital, \$5 billion for new plant and equipment-to meet corporate financial requirements.

Incentive for Investment

The role of the profits that are paid to stockholders as dividends or to employees under profit-sharing plans is even more important than the role played by retained profits in providing plant, equip-

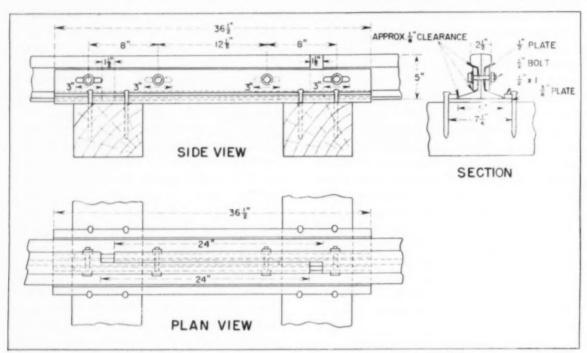
ment and working capital. Dividend payments provide the main incentive for investment in the stocks of corporations. They are the reward for risks taken by investors. Dividends paid by corporations whose common stocks are listed on the New York Stock Exchange provide an average return of about 6.5% at present prices, and dividends on preferred stocks average about 4.5% return. Dividends are distributed among 6.5 million stockholders. Also, it is estimated that 3 million employees now are covered by profitsharing plans. These plans increase the incentives of both production workers and managers to work harder and more efficiently.

Thus, more than 9 million Americans have a direct financial stake in corporate profits through ownership of stock or participation in profit-sharing plans. But all Americans share indirectly in the rewards of a successful business year. Investment of a major part of 1953 profits in new plants and equipment means more employment opportunities and better working conditions for labor. For the nation, it means new industrial capacity that is essential both for national defense and to produce more and better goods for a rising standard of living.

Corporate profits after taxes represent about 6% of the nation's total income. But the job they do to stimulate investment and to finance industrial expansion and improvement is more farreaching and more essential to the prosperity and well-being of the American people than would be suggested by that small figure.

McGraw-Hill Publishing Company, Inc.

Operating Ideas



SLOTTED BOLT HOLES in fishplates permit sliding action as rails expand or contract.

Expansion Joint Keeps Kinks out of Welded Main Track



OPERATING IN AN AREA which may experience annual temperature variations of more than 100 F, officials at Sunnyside mines, Kaiser Steel Corp., Sunnyside, Utah, have solved the problem of keeping temperature-induced kinks out of their welded 80-lb haulage track by installing split-rail expansion joints at intervals outby the point of constant temperature in the mine. In figuring the job, the maximum possible change in length under changing temperatures is apportioned among a number of expansion joints, which will result in a reasonable gap or stress as the rail contracts or expands.

In making the joint, the ends of the rails are cut down through the head, web and flange to provide half-sections which nest in each other to form a new, complete rail section. Half the track-bolt holes in each fishplate are slotted to permit the bolts to slide as the rails contract or expand. The remainder of the track-bolt holes in each fishplate are not slotted, thus insuring rigidity in the joint. Each rail has a rigid attachment to one fishplate and a sliding attachment to the other, since the outer holes in one fishplate are slotted and the inner holes in the other. Finally, the joint is carefully bonded to preserve the electrical characteristics of the welded joints, and the joint is set in a steel cradle which provides lateral stability.

CY ROSS, of Sunnyside's engineering corps, points out the separation between half-sections of rail in expansion joint built into welded track.

DOWNTIME IS GOING UP!

Double reason why you need Correct Lubrication!

Today, it costs you more in every way when one of your machines breaks down. It costs you more to replace parts—in some cases, as much as 100% more than in the last, so-called "normal" year. It costs more per man-hour for maintenance. And because your machines produce more today, it costs you more when downtime stops production.

That's why a program of Correct Lubrication is vital for your plant. This program includes an analysis of all your machines by a lubrication specialist, recommendations of the right lubricant for every machine, advice on correct application, progress reports on the benefits achieved.

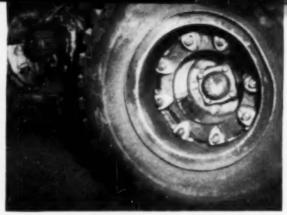
In plant after plant, such a program has helped reduce downtime to record lows by improving machine efficiency—prolonging machine life. Why not see what it can do for you? Call in your Socony-Vacuum representative!



Socony-Vacuum Correct Lubrication
First Step in Cutting Costs

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION





SHUTTLE-CAR CHANGEOVER for better performance—A 2-wheel-, 2-wheel-steer unit in the Blair Fork No. 4 shop during installation of dual wheels, improved hydraulic steering and disc-type brakes. In substituting the two 8:25x15 tires, a special spider is utilized to accommodate the open-type rims held in place by truck lugs (right).

Dual Wheels Improve 2-Wheel-Drive Shuttle Cars

SHUTTLE CARS of the 2-wheel-drive, 2-wheel-steer type (32-E and 42-E), which were largely replaced at an eastern Kentucky mine by 4-wheel-drive, 4-wheel-steer units (6-SC) because of a soft bottom, have been given a new lease of life by a changeover to dual-drive wheels.

The revision was worked out in the shop at the Blair Fork No. 4 mine of the Jewell Ridge Coal Corp., Tilford, Perry County, Ky., where F. F. Stewart is superintendent and J. N. Sparks is superintendent of maintenance. Because the dual wheels compact the roadway, in comparison with the single tires of the 6-SC cars which make deep ruts, the revised 32-E and 42-E cars equal the 6-SC units in performance at this mine.

As shown in the photographs above of a 42-E car in the mine shop, two 8:25x15 tires were substituted for the original 10:00x20 single driving tire on a drop-center rim and are arranged so that the space between sidewalls is 2½ in. In making the change, a special spider was built and bolted to the hub to replace the original 42-E wheel. The open-type rims are bolted to the spider by Ford truck lugs.

Front wheels also were changed from 8:25x20 on drop-center rims to 8:25x15 tires on open rims. The wheel change reduced load clearance of the car from 10 to 7 in. Over-all height of the main frame of this car has been cut from 42 to 34 in and sideboards will be used to raise its capacity to 5 tons. Another change being made on this car is the application of hydraulic steering of the same type as used on 6-SC units, which gives faster action and improved accessibility of parts. A third revision consists of replacing the 4-wheel automobile-

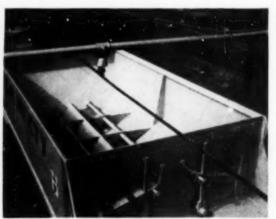
type brakes with the disc type applied to each gear reducer.

The first cars changed at the Blair Fork shop were 32-E units and the size of the dual tires used was the same as that of the original tires. The 32-E units now are in use at the company's Jewell Valley (Va.) mine.

When the proposed changeover to dual wheels was first being investigated, the opinion was expressed that driving the extra wheel over the soft bottom would increase motor heating, but such proved not to be the case even though more coal was hauled. Compacting of the roadway by the dual tires was considered to be the responsible factor.

As a result of this Jewell Ridge development, at least one other company now is well along on a program of adding dual wheels to its 2-wheel-drive shuttle cars.

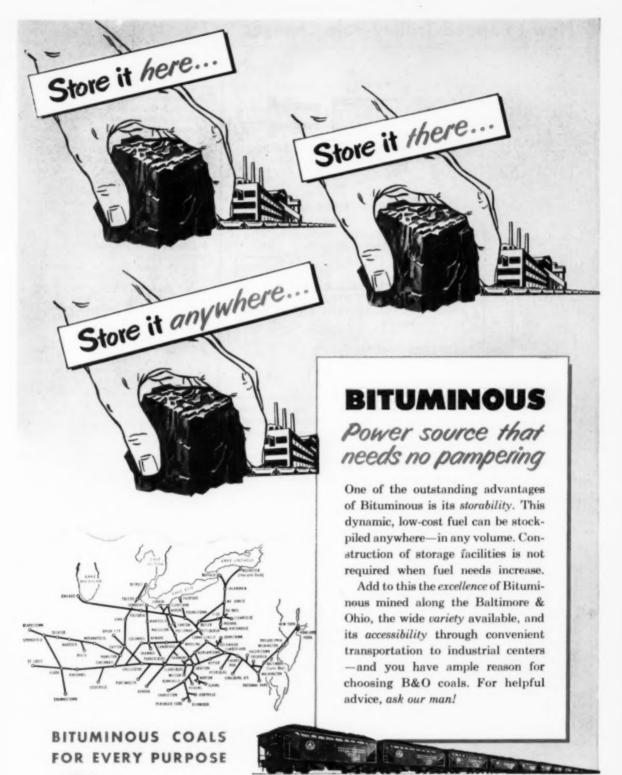




Sectionalized Ballast Car Permits Controlled Dumping

CONTROLLED DUMPING of slag or limestone at any point as needed is possible with a new-type ballast car now in use at the Piney Fork No. 1 mine of the Hanna Coal Co., Div. of Pittsburgh Consolidation Coal Co. The four sections of the dropbottom unloading mechanism are operated by individual levers, thus permitting dumping just the right quantity of material at any one place with a minimum of effort.

The car was designed by Harry Corona, general outside foreman, and built in the Piney Fork car shop by John Gaboski and Albert Atkins. It has a 10-ton capacity and measures 7x18 ft. It was built on an old-type truck, with center tie bars added. In its construction, %- and %-in steel plate was used in the body and %16-in steel plate on the sides, for the necessary strength.

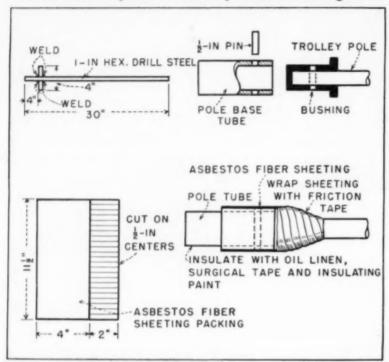




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How to Speed Trolley-Pole Changes



FAST AND SAFE changing of trolley poles is possible by using drill steel to drive the pole from the pole-base tube (top drawing). Protection from electrical shock resulting from accidental contact between the pole base and the trolley wire is provided by thorough insulation (bottom).

TWO OPERATING KINKS developed by Harry Lanier, electrician helper, The New River Co., Summerlee, W. Va., have been used successfully to reduce the time required to change a locomotive pole and to prevent shock to motormen or maintenance men while engaged in making the change.

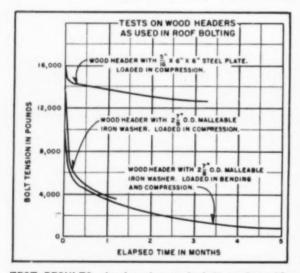
Often it is necessary to change trolley poles underground where motormen and repairmen are rstricted to a small space. As a result, there is danger from shock if the pole base tube strikes the trolley wire as it is lifted from the tube support on the locomotive. To eliminate this, a re-usable insulating cover was made for the top of the pole base tube and the lower part was insulated with oil linen and surgical tape and painted with Jeffrey insulating paint.

The cover is made from a piece of 6 x 111/2-in asbestos fiber sheeting packing. Cuts 2 in long and spaced apart are made along the long side of the material. This material is then wrapped around the top of the pole tube with the cut edge extending over the pole. Friction tape wrapped around the

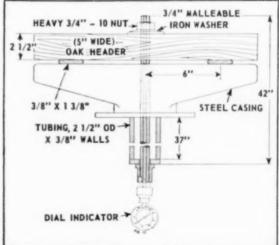
cut edge holds the cover tightly against the pole.

To speed removal of the pole from the pole base, a piece of 1 x 30-in hexagonal drill steel is used as a churn to drive the bushing-covered pole out. Protection for workers' hands is provided by a piece of 4-in-diameter iron welded to the steel 4 in from the end.

These two simple devices have made it possible to change a pole in half the time previously required, Mr. Lanier







LABORATORY SETUP used to study bending and com-

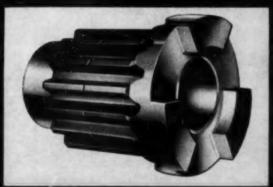
Wood Headers Cause a Decrease in Roof-Bolt Tension

TO BEST ANSWER various inquiries from operators using wooden cap pieces in roof bolting and the concern of some over the possible loss of bolt tension

when wood is introduced into the assembly, the Ohio Brass Co., Mansfield, Ohio, has conducted a number of laboratory tests on the subject. Results of these tests are briefed below, as outlined in the company's publication, Haulage Ways.

In making the investigations on wood





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You'll find they're packed with great new features . . . loaded with big new advantages that mean faster, more efficient service and lower operating costs on your job.

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You get new high-compression power and greater operating economy with three advanced valve-inhead engines. Bigger, brawnier engine. Rugged, durable "Load-

"Thriftmaster 235" engine. Rugged, durable "Loadmaster 235" engine. Mighty, all-new "Jobmaster 261" engine"—most powerful in Chevrolet truck history.

Most trustworthy trucks on any job!



ADVANCE-DESIGN TRUCKS

NEW RUGGEDNESS AND RELIABILITY Heavier axle shafts on 2-ton models. Bigger, more durable clutches on light- and heavy-duty models. Stronger, more rigid frames on all

models. New pickup and stake bodies are built to stand the roughest going and to keep coming back for more—and they give you greater load space for '54!

NEW COMFORT AND CONVENIENCE New Comfortmaster cab provides increased visibility with new onepiece curved windshield. New Ride Control Seat* brings you

extra driver comfort. New truck Hydra-Matic transmission⁶ offers the last word in no-shift driving ease. Available not only on ½- and ¾-ton Chevrolet trucks, but on 1-ton models, too!

Plan to see the completely new '54 Chevrolet trucks, and get the whole money-saving story at your Chevrolet dealer's now.... Chevrolet Division of General Motors, Detroit 2, Michigan.

*Optional at extra cost. Ride Control Seat is standard on C.O.E. models, available on all other cah models as extra equipment. Rear corner windows in standard cah, optional at extra cost.

MORE CHEVROLET TRUCKS IN USE THAN ANY OTHER MAKE

headers, the widely accepted theory that it is better to prevent roof movement than to arrest it after it starts was followed, the company points out. In general, any support member that is unstressed cannot completely prevent movement of the structure it is supposed to be supporting. Correct preloading of the support should be used to eliminate movement. Therefore, the O-B laboratory endeavored to establish the effect of wood cap pieces over long periods of time.

The accompanying chart illustrates some of the various studies to date and

the decrease in bolt tension with time. As shown, when a wood header was loaded in direct compression with a ½ (a/6x6-in steel plate, bolt tension dropped approximately 15% in 600 hr. With another header loaded to about the same value but with a malleable iron washer (2% in, OD) bolt tension dropped approximately 72% in the same period. The same tendency for bolt tension to decrease was evident when testing wood loaded in bending.

In the tests, it also was found that the loss of tension occurred with both types of loads at an ever decreasing rate. Approximately the same decrease took place from 60 to 600 hr as would occur from 600 to 6,000 hr. This finding was substantiated in test after test where only dry, hard wood was being used. However, when washers were used on green headers, many of the washers pulled completely through on installa-

In considering the reports, the fact that the tests were concentrated on the wood factor alone should be stressed, Haulage Ways points out. The tests measured only the decrease in bolt tension as a result of wood cap pieces.





EFFECTIVE, fast track cleanup at Compass Coal Co. is handled by a rubber-tired tractor-shovel equipped with a special grooved bucket to clean track down to the ties. One-man unit can load into trucks or train to end of track.

Tractor-Shovel Speeds Tipple-Track Cleanup

FASTER, easier and more economical cleanup of tipple tracks is the result of application of a rubber-tired tractor shovel to this job at the Compass mine of the Compass Coal Co., Philippi, W. Va. One man, using the new unit, now cleans both loaded and empty tracks during the work shift, whereas five to six men using shovels and wheelbarrows formerly were required to do the job on an off shift.

Two-shift operation on a 5-day week resulted in railroad tracks becoming extremely dirty by the end of the week. Tracks were covered with an assortment of materials ranging from limestone to bits of scrap iron as a result of car cleaning on the empty tracks. Loaded tracks at and below the preparation plant also required regular cleaning because of coal spilled while loading and dropping cars to the loaded sidetrack.

Continuing expansion at the Compass mine increased the problem and Paul Stewart, tipple foreman and maintenance supervisor, was assigned the job of finding a mechanical method for cleaning the tracks. A call to Rish Equipment Co., Clarksburg, W. Va., resulted in a Hough Payloader, Model HF, with a special track-cleaning bucket being brought to the tipple for a demonstration. The results were so impressive that the unit never left the property and has been in service ever since.

Compass management feels that the unit will more than pay for itself in one year. In 1952, about \$4,000 was spent for labor alone in track cleaning, and now one man can do the cleanup work plus many other jobs. "Regardless of money spent in hand-cleaning tracks previously, our tracks never were really clean. We now keep our tracks constantly clean with a minimum of time and money spent for this work," said Stephen Canonico, president, Compass Coal Co., in summing up the performance of the new unit.

Before the new unit was purchased, it was necessary to call out a crew of five to six men on an off day, usually Saturday, to clean the tracks. These men, using shovels and wheelbarrows, worked the entire day on cleanup work.

Now, with the new unit, cleanup work is done during the shift. When an empty track needs cleaning, all cars are loaded from that track first and, when it is clear the Payloader moves in and removes the dirt. The unit usually takes a 600-ft pass along the track before it must tram and unload at the end of the track. Two passes, one on each side of the track, usually are sufficient to clean each 600-ft section, after the heavy initial cleaning.

When the loaded tracks need cleaning, a truck works with the unit and hauls the coal to the R-O-M bin from



CLEANER TRACK, at less cost, is the payoff with the rubber-tired unit, which has replaced hand methods.

which it is later fed to the plant for recleaning.

In addition to performing cleanup work, the new unit has time to carry out such jobs as pulling railroad cars, spotting sand cars, loading spillage at the deep mine bin, loading coal from the stockpile into trucks, loading rock at the rock crusher site and moving a portable welder.

Equipment News

HOW TO ORDER... more information on the new products and the free literature described in this section. As you check over the 61 items on these Equipment News pages, note the numbers of the items that interest you. Circle the numbers on the postage-free eard facing p 120, sign and mail the eard. That's all there is to it. Coal Age will inform the manufacturers of your request.





New Coal Hauler Transports 40-Ton Loads at 34 MPH (1)

The new Athey PH-20 Coal-Hauler, announced last month by Athey Products Corp., pairs up with the Caterpillar DW-20 tractor as the latest entry in the field of high-capacity, strip-mine haulage. Powered by a 6-cylinder, 275-hp Caterpillar diesel engine, the tractor hauls the new 40-ton trailer at speeds up to 34 mph, as shown in recent applications at strip mines in the Canton, Ill., area.

The new bottom-dump trailer features frameless, welded construction, designed to eliminate dead weight and to absorb the twists of high-speed haulage. The hopper and doors are constructed of high-strength steel plates, with the drawbar an integral part of the hopper. Reinforcement includes box-type, tubular

and angle members inside and outside the hopper. Such construction fixes the total weight of the empty trailer at 25,-500 lb. The Caterpillar tractor weighs 25,600 lb.

Bottom doors are closed by a hydraulic ram operating a cable-reeved takeup. A positive mechanical lock holds the doors closed against the load, and an air-operated tripping device releases the lock for unloading. The doors may be dropped open quickly for discharging into a hopper or they may be opened slowly against hydraulic pressure in the ram cylinder for stockpiling.

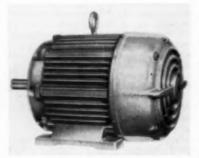
Single 24:00x29 tires and wheels on the trailer axle are interchangeable with tires and wheels on the rear axle of the trac-

tor. Under full load, 41% of the total weight acts upon the drive wheels of the tractor to insure good traction under all pit conditions, the maker points out.

The hopper is wide (10 ft) and short (22 ft 9 in) at the top to provide a good target for the shovel operator. The short wheelbase (26 ft 1 in) permits increased maneuverability, and the over-all length of tractor and trailer (43 ft ½ in) permits non-stop turns to be made within a minimum width of 43 ft. Brakes are air-operated from the tractor cab, those on the trailer setting first to prevent jack-knifing. Each wheel has 22x7 in of braking surface. Complete details and literature obtainable from Athey Products Corp., Chicago 38, Ill.

New AC Motors up to 40-Hp Ratings in Smaller Frames (2)

Redesigned electric motors in open drip-proof, totally-enclosed fan-cooled and explosionproof enclosures (illustrated) in ratings up to 40 hp at 3,600 rpm recently were unveiled by the Louis Allis Co., Milwaukee 7, Wis. Known as the L. A. line, the new motors are built to the revised NEMA frame-size standards and will be available after Jan. 1. In addition to packing more power in smaller space, the new units are lighter in weight, even though starting and breakdown torque, efficiency, power factor, temperature rise and other service factors are the same as those delivered by the older, bulkier units. Bearings have been designed to give years of service



without maintenance or lubrication, the maker says, and the effectiveness of grease seals has been improved. Other improvements include better ventilating system, new conduit boxes permitting easier electrical connection, a lead-identification template inside the conduit box providing permanent and positive identification of the leads even if the lead tags are lost, new nameplates with more complete information, and a removable plug at the front-end bearing to facilitate speed checks.

The company contemplates no increase in price for the new motors, and the older line will continue in production for existing applications where unit-forunit interchangeability is important. Full details available from the manufacturer.



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Service is at the disposal of all mine operators . . . just contact
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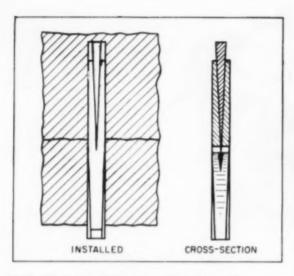
Over 300 Tycol industrial lubricants are at your disposal . . . engineered to fit the job!

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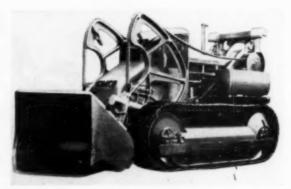
Wedge-Type Wooden Roof Pin (3)

Newly patented wooden wedge-type roof bolt or pin developed by the J. V. Hammond Co., Spangler, Pa., has V-shaped grooves in each at right angles to each other for insertion of wooden wedges. Each wedge has a V-shaped groove in the center of its apex, and since the total length of the two wedges together is more than that of the pin the wedges intersect each other when the pin is fully inserted. On installation in the proper-size hole, the pin will expand along its entire length to prevent entrance of air into the drill hole and thus into any cracks between the roof laminations or strata, the maker points out. Since the two ends of the pin expand slightly more than the middle portion, it effectively serves to pin the lower strata of the mine roof to the adjacent strata, it is said. Full details of sizes and use from the company.



High-Speed 10-Ton Truck (4)

To meet the need for a fast, highly maneuverable heavy duty truck, the Dart Truck Co., Kansas City, Mo., has added to its line the Model 10-S, a 10-ton unit utilizing many features of its larger trucks. Among the design advantages cited by the maker are: box section frame; forward one-man cab for more driver visibility; 100-in wheelbase and a turning radius of less than 20 ft for maneuverability in close quarters; six 16-ply rock-lug-type tires of the same size for switching; and a twin double-acting single stage hoist raising to a 60-deg dumping angle and dumping in 10 sec. The unit is powered by a Continental RD6572 156-hp 6-cylinder diesel engine and also features front-end suspension and heavy duty construction throughout for long service. Full data from Dart.



New-Type Heavy Duty Tractor-Loader (5)

Eimco Corp., Salt Lake City, Utah, last month announced its Model 105 cab-in-front overhead loader or prime mover said to offer a radically new design with varied operating advantages. Features cited by the maker include a matched 90-hp diesel engine and torque-converter drive, new compact Uni-drive transmission containing all gearing and clutches for speed changing and independent reversal of each track, substitution of push-button controls for foot clutches and manual gear shifting, 2-speed discharge on loader and bucket capacities to 2½ cu yd. Increased maneuverability is provided by the unit's ability to reverse immediately in motion, change speed under full power in motion and spin-turn by independent control of each track, it is said. Bulletin L1032 from Eimco.



1954 Truck Line Re-Engineered (6)

Completely re-engineered to give outstanding performance in modern hauling requirements, new line of Chevrolet trucks introduced last month provide improvements in every part of the vehicles—engine, chassis and body. Features cited by the maker include three new engines, with increased horsepower and outstanding, economical performance; increased durability, with heavier axle shafts in the 2-ton models, bigger clutches on light- and heavy-duty models and more rigid frames on all models; improved driver comfort; easier loading and more space for payloads. For heavy-duty models the most powerful truck engine in Chevrolet history, the 135-hp Jobmaster, is offered as optional equipment, providing greater power for acceleration and grade-climbing and reducing the need for operation in low gear to produce longer engine life and economy, it is said. Details from Chevrolet Motor Div., Detroit 2.

Use the postage-free postcard facing p 120 to get more information on the new products or the free catalogs and bulletins listed in this section.



PROTECTIVE RUBBER SHEETS (7)

"Iron-Rubber" sheets, the latest addition to the expanding Magic-Vulc line produced by the Magic Chemical Co., Brockton 2, Mass., is a new easily and quickly installed protective sheeting that is said to successfully combat abrasion, impact and corrosion and to outwear steel plate in many applications. It is part'cularly suited to chutes (shown above), hoppers and launders, duets and pipes, skips, housings, bins and shaking tables, etc., subjected to excessive wear. It is available in any thickness and length up to 36 in and in two types; reinforced Iron-Rubber composed of two sheets of rubber permanently bonded to a central core of expanded steel, which can be stood on edge without buckling, bent to fit corners without spring-back or shaped to fit practically any contour; and non-reinforced Iron-Rubber, a single sheet of rubber with greater flexibility. Full details from the company.

RAYON CONVEYOR BELT (8)

A rayon-carcass conveyor belt that is sturdy but lighter than cotton-duck belts has been added to the line of the New York Belting & Packing Co., Passaic, N. J. Called Nyb-Ray, the new belt will perform equivalent load-carrying capacities of higher priced cotton-carcass construction, and has good troughability, flex life, tear resistance and fastener-holding ability, and a lower stretch factor than cotton duck, according to its maker.



25-HP VARIABLE SPEED DRIVES (9)

Link-Belt P.I.V. positive, infinitely variable speed drives designed for accurate speed control over a wide range of speeds now are available in two new types for 20- to 25-hp applications. In addition to the basic H-6 P.I.V. of 25-hp capacity, Link-Belt can now supply an



HG-6 drive furnished with either a single-reduction input or single-reduction output helical gear attachment, or an HGG-6 drive furnished with both a single-reduction input and single-reduction output helical gear attachment. Input gear reductions are available from 1.93:1, minimum, to 5.82:1, maximum; output gear reductions from 1:1 to 6.33:1; and speed-increasing gear sets also are available. Bulletin 2374 with full data on the three types and various ratios and assemblies offered by Link-Belt Co., Chicago 1.



NEW ROOF BITS (10)

Two new bits designed for the more efficient drilling of mine roof have been announced by Kennametal, Inc.'s, mining tool division, Bedford, Pa., the new FDL bit design for fast drilling of some of the less difficult roof and the Style FDH bit for harder materials. The Style FDL bit has cutting blades that track and are identical in design dimensions, with a long-wearing edge on the gage at a slightly positive radial rake and a slightly positive back rake angle, features said by the maker to provide very rapid rates of penetration and minimum of load on the drill unit. The Kennametal FDH bit is built for the more powerful hydraulic drills and to give a maximum of service life where roof-drilling conditions are difficult. Details from Kennametal.

STRONGER TRUCK TIRE (11)

A new extra-tread truck tire called the U. S. Royal Super Fleetway is the first commercial tire made with super-tenacity rayon cord that is 20% stronger than ordinary rayon, according to the United States Rubber Co., New York 20. Service features of the new tire cited by the maker included up to 79% more flex fatigue resistance; as much as 20% more resistance to ruptures, assuring more recappings; cords firmly bonded together with plastic resins that have exceptional adhesion; up to one and one-half times the tread rubber, which coupled with the unusually strong carcass construction, gives longer original mileage plus a sounder base for more recap mileage; a deepened tread for extra high mileage; and a thicker undertread to give protection against penetration by foreign objects. Full details from the company.

SPLIT ROLLER BEARINGS (12)

Now available throughout this country from independent bearing distributors, English-made Cooper split roller bearings are designed with their components split right down to the shaft with the result that the bearings can be applied where it is difficult or impossible to mount conventional-type solid ball or roller bearings. The split feature does not limit the application of Cooper bearings and their



use brings added maintenance economy and machine efficiency to any roller-bearing application because the exclusive split design permits an anti-friction roller bearing to be assembled around the shaft, the maker reports. Both fixed and expansion-type bearings are available housed in split cartridges with self-aligning spherically ground O.D., which are mounted in machined split pillow blocks. New 20-p catalog with full details offered by the Cooper Split Roller Bearing Corp., 700 Cedar Blvd., Pittsburgh 28, Pa.



CARTRIDGE RESPIRATOR (13)

New Pulmosan Chemocart C 256 chemical single-cartridge respirator has received U. S. Bureau of Mines Permissible Approval 2309 for low concentration of organic vapors. Full details on construction and operating features are available from the Pulmosan Safety Equipment Corp., Brooklyn 17, N. Y.

Equipment Shorts You'll Want to Check

(14) MAGNETIC FLOOR SWEEPER, carrying a non-electric permanent Alnico magnet on a rubber-tired truck, is designed to simplify cleaning of shop floors, reclaim valuable ferrous scrap, keep garages and runways free of nails, etc. Two models are available, 16 or 20 in wide, and both have adjustable clearance from 1 to 3 in. Details from Dings Magnetic Separator Co., Milwaukee 46, Wis.

(15) STEEL-HARDENING COM-POUND-Steel rock bits treated with HARD-N-TUFF steel-hardening compound provide up to five times the service and much faster drilling than untreated bits, according to tests cited by the manufacturer. The compound is easy to apply and is useful in many types of work besides drilling, it is said. Literature and details from Doughty Laboratories, Inc., New York 36.

(16) ALUMINUM PIPE COUPLERS—New larger 6-in couplers and fittings to its line of aluminum couplers for portable pipe lines has been announced by Wade Mfg. Co., Portland 9, Ore. Designed as a lightweight, quickly attached, strong coupler particularly adapted to field use of portable pipe lines, "Quick-Lok" couplers will handle any liquid not corrosive to aluminum and steel and are now available in 2-, 3-, 4- and 6-in sizes. New bulletin with full details offered by the company.

(17) FOR TANK LININGS or other applications, new Neoprene 100 permits application of brush coats 10 to 20 mils thick, with no loss of physical or corrosion-resisting properties, the maker says. Coatings cure at room temperature, and the heavy-coat characteristic is combined with excellent pot life and a cor-

rosion resistance comparable with heatcured Neoprene, it reports. Details in Bulletin 700, issued by the Carboline Co., St. Louis 19, Mo.

(18) BATTERY-CHARGING CONTROL -Newly patented "Acutrol" regulator, said to be a revolutionary method of regulating the charging rate for generator and charging circuits, is a mechanical regulator rather than the voltage-type regulator and actually breathes with the battery. The unit registers internal gas pressure in the battery and relays the charging rate to the generator, including the necessary adjustments based on outside temperature. According to tests cited by the maker, it delivers 80% more effi-ciency in all standard batteries, and in most cases is guaranteed to double the life of batteries under conventional voltage-regulator-type control. Acutrol is said to be easy to install and practically eliminates the continual necessity of adding water to the battery. Full details from Franklin Products, Inc., Milwaukee

(19) CHAIN-OILING SYSTEM, latest addition to the Oil-Rite line of chain oilers, will lubricate a number of individual chains or oil the sides of chains, with various brush sizes available for specific applications. The low-cost, simple, automatic central method of lubrication replaces the old-fashioned hit or missioling and will save labor, prolong the life of costly chains, reduce friction and therefore, power consumption, the manufacturer points out. Full details in Bulletin 69-30 from Oil-Rite Corp., Manitowoc, Wis.

(20) PROTECTIVE COATING—"Galvicon," a new type of cold galvanizing

compound for surface protection of steel and iron, may be applied with an ordinary paint brush, electric spray gun or by cold dip, without special equipment or personnel training, the maker says. Iron or steel surfaces coated with Galvicon create an electro-chemical union, thereby uniting the zinc with the base metal's surface, and it may be applied over adhering rust to prevent further rusting, it is reported. Literature from Galvicon Corp., New York 1.

(21) ALUMINUM PLATING of all highheat metal surfaces now is possible with its new fast-drying aluminum paint, reports Sapolin Paints, Inc., New York 17. Applied by brush or spray, the new paint dries hard in 30 min, can withstand temperatures up to 1,200 F without discoloring or blistering and one coat prevents rust, cracking or peeling, the company says.

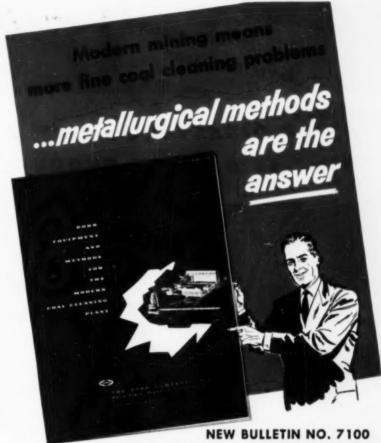
(22) NEW ELECTRODE said to be particularly suited for hardfacing mining, crushing and other types of heavy equipment, Coated Tube Stoodite has a deposition rate much faster than with east electrodes and a welded deposit that is smooth, sound and free of pinholes or checks. It is readily weldable to all carbon and alloy steels including manganese, with a Rockwell C hardness of 56 to 60 and properties retained at temperatures up to 800 F. Literature from Stoody Co., Whittier, Calif.

(23) FIRST-AID KITS, the new MSA Type D all-weather first aid kits designed for installation in trucks and company cars exhibit new design and packaging features, a special color-identification system for the packaged materials, and the first-aid items from inhalants to bandages are rigidly controlled to pharmaceutical standards by a quality control procedure. Individual packages of ma-terials feature simplified, fully illustrated instructions in large clear type. Bulletin 0401-2 with details from Mine Safety Appliances Co., Pittsburgh 8, Pa.

(24) TRACTOR-SHOVEL-Performance of the Hough Model HM PAYLOADER tractor-shovel has been considerably improved by the addition of a hydraulic torque converter, according to the Frank G. Hough Co., Libertyville, Ill. Incorporated in the gasoline- and diesel-engine models, the converter is a 3-elementtype which multiplies the torque output of the engine in direct proportion to the load requirements and in conjunction with the 4-speed, full-reversing transmission, it provides a much smoother drive than has previously been available, it is said. Details from the company.

(25) PORTABLE VIBRATOR - New Cleveland Type HCRR air vibrator features portability and compactness and is easy to handle and operate, it is said. It can be quickly attached to a railroad car, or can be used to keep materials moving from or into hoppers, bins and chutes. Details from Cleveland Vibrator Co., Cleveland.

(26) MAINTENANCE TOOL-Ingersoll-Rand Co., New York 4, has announced a



will show you how metallurgical methods can help you solve the problems of . . .

dewatering table feed, concentrates and tailings

slimes thickening and water clarification

desliming for fine coal recovery

pumping and metering underflow from Thickeners and Hydroseparators

Today's mechanized mining and loading techniques have resulted, in greater production and economy for the coal producer. But they've brought him problems too . . . in the form of vastly increased quantities of non-coal products in washing plant feed. Tough too, for the washing plant operator is today's emphasis on better coking coal quality and the increasing stringency of stream pollution regulations.

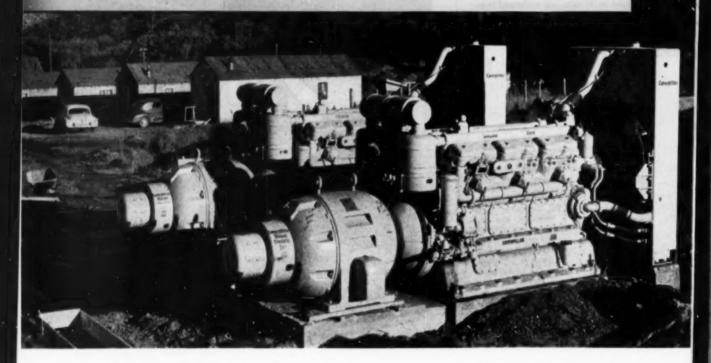
If these problems sound familiar to you, it will pay you to write for Bulletin #7100, "Dorr Equipment and Methods for the Modern Coal Cleaning Plant." It will tell you how proven metallurgical methods can be applied. The Dorr Company, Engineers, Stamford, Conn.



THE DORR COMPANY . ENGINEERS . STAMFORD, CONN.

ALERT CATERPILLAR DEALER
SAVES THE BACON

AFTER DISASTROUS FIRE, RED WING MINE IS BACK IN PRODUCTION FAST!



A fire of undetermined origin reduced to smoking junk all power units at the Red Wing coal mine, Axial, Colo. Anxious to resume production as soon as possible, President W. J. Thompson of Colowyo Coal Co. put through a rush phone call to his Caterpillar Dealer in Denver.

Based on his experience, the dealer recommended the powerful Cat* D397 Electric Set for the job. The most readily available D397 was on display at the American Mining Congress in Denver. The 315-KW unit was pulled from the show and hustled to the mine. Within hours it was hooked up, and the mine producing again.

So impressed was the Colowyo Coal Co. with the performance of the electric set and the dealer service that they ordered two new D397s to replace their burned-out equipment of another make. At 6400 feet altitude, these two Caterpillar Electric Sets, together with a smaller Cat D311, furnish all power for a yearly output of 90,000 tons.

This story proves that when the chips are down you can rely on your co-operative, resourceful Caterpillar Dealer. He offers ruggedly built, honestly rated Caterpillar Engines and Electric Sets up to 500 HP and 315 KW. Ask him today to help you select the best investment in power for your mine!

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

WE'VE MADE CLAIMS...
NOW MAKE US
PROVE THEM

USE THIS CARD ... TO GET MORE INFORMA-TION and bullsting.

(87) THROTTLE CONTROL des

(26) PHOTOELECTRIC RELAYS—Two new G-E photoelectric relays featuring higher contact ratings, improved circuit design and a full line of enclosures, one rated at 450 and the other at 600 oper-

YES-I would like more information . . . Please send me catalogs or further information about the items from the Equipment News Section whose numbers are circled. (Dec., 1953) 1 6 11 16 21 26 31 36 41 46 51 56 61 2 7 12 17 22 27 32 37 42 47 52 57 3 8 13 18 23 28 33 38 43 48 53 58 4 9 14 19 24 29 34 39 44 49 54 59 5 10 15 20 25 30 35 40 45 50 55 60 in addition, please send me data on those OTHER products advertised in this issue (give name and page number)

NOT COOD if mailed after Feb. 1, 1954

29) WELDING ROD of mangament of the control of the

other uses of industrial explosives, he been published by Atlas Powder Co Wilmington 99, Del. It is entitled "Bette Biasting," and describes modern tech niques in practical, readable fashion.

(86) ALUMINUM FREIDER CABLE for mining service is discussed in 16-p Supplement 1 to Catalog 27 issued by the Ohio Bress Co., Mansfield, Ohio, Included are the detailed installation procedure and descriptions, specifications, etc., for the complete line of O-B fittings for altrium feeder cable.

(36) DRILL STEELS—Bethlehem Steel Co., Bethlehem, Pa., offers a 20-p Booklet 345 on its mining and quarrying steels. Four groups are discussed in detail: hollow and augar drill steels for biasthole drilling; solid drill steels for drilling and for the manufacture of a variety of tools; broaching and channeller steels for quarrying dimensional stone; and stone-dressing steels. A special chapter is devoted to uitra-alloy steels, a thoroughly proved analysis of the chromitum-molybdenum type.

and conomical methods of applying Formula 5 and conomical methods of applying Formula 5 and conomical methods of applying Formula 5 to coal, plus how to use it asswhere to obtain it. Offered by the Mortes Salt Co., Chicago 8.

(40-42) ELECTRIC MOTORS—The cently announced G-E line of Tri"36" motors, built in 1- to 80-lip reto latest NEMA dimensions, are

FREE BUILLETINS AVAILABLE

(36) MINE LOCOMOTIVES—New 44-p bulletin covers the complete line of Jeffrey locomotives for coal mine service, including trolley, cable-neal and battery types. Full details of design and operating features, sizes, specifications, accessories and equipment are provided. Catalog 836 available from the Jeffrey Mfg. Co., Columbus 16, Ohio.

(32) STNCHRONOUS MOTORS, their operation and control are described in a new 16-p Bulletin GEA-5873 offered by the General Electric Co., Schenectady 5, N. Y. It explains the electrical operation

(83) CONVEYORS, FREDERS, ETC.—44-p Catalog 860 on Jeffrey material-handling and processing equipment contains details of operating and construction features, sizes, specifications, etc., on a wide range of Jeffrey equipment. Covered, for example, are various types of feeders, conveyors, elevators, vibrating screens, crushers, magnetic separators, power-transmission machinery and accessories. Offered by Jeffrey Mfg. Co., Columbus 16, Ohio.

(84) PLASTIC PIPE—Catalog Adv. 600 offers full details on Republic Steel's newest product, plastic pips. It talls why Republic entered the plastic-pips field, describes the two principal types of plastic-pips made, shows how to join plastic-pips, and lists various engineering and corrotion data. Available from Republic Steel Corp., Cleveland 27.

BUSINESS REPLY CARD

No Postage Stemp Necessary If Mailed in the United States

Postage Will Be Paid By-McGRAW-HILL PUBLISHING CO., INC. THE EDITOR COAL AGE 330 WEST 42nd STREET NEW YORK 36, N. Y.

scribed in three new bulletins available from the General Electric Co., Schemectady 5, N. Y., which contain complete descriptions of new maintenance, performance, and protective features of the line. Circle 40 on the postage-free card for 16-p Booklet GEA-8013 covering dripproof models; 41 for Bulletin GEA-6012 on enclosed motors; and 42 for Bulletin GEA-6027 on the new gear protect.

(49) DRILL BITS—Bulletin 4146 shows the complete range of Carset Jackhits for various threaded connections in use today and provides a selection guide for choosing the right Carset bit for each connection and application. From Ingersoll-Rand Co., New York 4.

(44) TRUCK TIRES—A 24-p illustrated booklet showing a variety of off-the-road tires perforating leavy service in coal stripping and other operations has been released by The B. F. Goodrich Co., Akron, Ohio. Every off-the-road tire in the BFG line is shown, with details of service conditions and performance of specific users.

(45) TIME SWITCHES—A catalog on the complete line of G-E time switches, process timers and time meters is available from the General Electric Co., Schenectady 5, N. Y. The new 24-p Bulletin GEA-5965 contains selection and application information, specifications, operating data and features, and pricing information.

(46) CENTRALIZED LUBRICATION—Case histories showing how a Farval centralized lubrication system installed on a machine or throughout a plant will assist in saving time, labor, power, bearings and lubricant, for increased production and lower cost, are detailed in booklet entitled "Studies in Centralized Lubrication 1933." From Farval Corp., Cleveland

(47) PERMANENT MAGNETS-Lidest information on the uses, design, properties and manufacture of Alnico permanent magnets, sintered Grade 5, is available in the Technical Report FM-111,

issued by Carboloy Dept., General Elec-tric Co., Detroit 32.

(45) PERFORATED METALS — 36-9 Caralog 39 from Diamond Mfg. Co., Wyoming, Pa., illustrates and describes a complete line of round, square, oblong and ornamental perforations, ranging from .02 to 9.5 in diameter. Included are hole sines, open areas, gage limits, with various industrial, architectural and ornamental applications,

(48) ANTIRUST PAINT-Product infor-mation Bulletin SS319-R on Rustrem an-tirust paint, offered by Speco, Inc., Cleveland 0, recommends uses for such of the six Rustrem colors and provides detailed data on their application, char-acteristics and results.

(5e) MATERIALS MOVING—Building and chines from Sauerman Pros., Inc., Chinese from Saue

(S2) FOC NOZZLES-Specifications and stops of the Bete B Series fog nozzles, 2 to 200 gpm, are provided in a catalog sheet offered by the Bots Fog Nozzle, Inc., Greenfield, Mass.

(52) METAL DETECTOR — Bulletin E. 42 describes the operation and application of the RCA electronic metal detector built to meet individual requirements on conveyors operating at speeds from 25 to 1,000 fpm. From RCA Victor Div., Camden 2, N. J.

(83) FUMPS—Operating data and specifications of Rice self-priming electric-powered centrifugal pumps, are provided in a bulletin from Rice Pump & Machine Co., Belgium, Wis. The units are available in belt and flexible-coupling drives, from 1% to 4 in and 55 to 350 gpm.

suitable for metallizing use-and details of its characteristics and methods of use, are covered in Bulletin 57C from Metal-lizing Engineering Co., Inc., Long Island City L. N. Y.

(S5) SHOVEL-CRANE—Bulletin called the Bantam City Press issued by the Schield Bantam Co., Waverly, Iowa, features details and specifications on Schield Bantam's new %-yd 5-ton Crawler Model C-35, as well as data on Bantam's allnew specially designed Craue Carrier, built specifically for mounting of the new Model T-35 truck-mounted Bantam.

(36) RADRO COMMUNICATION - 10 new bulletins describe latest improvements in many of the C-E radio communication equipments for industrial and other applications, covering six basic station combinations and four mobile combinations. The base stations are for operation in the 25-50 mc band and in the 152-174 mc band, and the mobile combinations all are for operation in the 152-174 mc band. Offered by Electronics Div., General Electric Co., Syracuse 1, N. Y.

(57) HARDSURFACING—"Selection and Evaluation of Methods of Hardfacing," a 12-p reprint of an article offered by Air Reduction Co., Inc., New York 17, discusses the major methods employed in the application of hardfacing materials, with special emphasis on the inert-gashielded are process, it is prepared as an easy-to-read guide in the selection of a hardfacing method for any particular application.

(SE) AIR-VERRATION EQUIPMENT, including metallic-impact types and aircushioned vibrators which operate with a minimum of noise, is covered in 16-p Dralog 109 from the Cirveland Vibrator Co., Claveland 13. Operating and application details including prices, are provided on the line, which offers 29 mountings and 14 piston-diameter sizes for a wide range of vibration intensities.

(80) PIPE AND TUBING—The products and applications of centrifugally cast heavy-wall cylindrical stock, tubes and IPS pipe manufactured as ESCO Spuncast are described in Booklet 184-A released by Electric Steel Foundry Co., Portland 10, Ore. Essentially a new raw material, ESCO Spuncast is a form for stainless and high-allby steels and other metals which offers new possibilities for reducing production costs of hollow circular or cylindrically shaped parts and products and which often makes possible entirely new and more economical production 2 recedures, the company reports.

(60-61) RADRO COMMUNICATION—
Two bulletins from the RCA Victor Div.,
Camden 2, N. J., describe two transmitter-receiver units. Circle 60 on the
postage-free card for Bulletin C.302 on
the Carfone Station "15," a portable
2-way radio unit for operation on the
152-174-mc band; and circle 61 for
Bulletin C.13 on the Type CMU-10A mobile unit for the 45-470-mc UNIF band.



TOAL CRUSHER

-with cut Gears—Segment Rolls and Renewable Crushing Plate Tips

Crush hard or soft coal in strip or underground operations with the dependable, low cost McLanshan Bantain Buster Single Roll Coal Crusher. This machine crushes coal to desired sire, with a minimum of operating and maintenance expense.

Bantam Busters have a high ratio of reduction and are portable, self-contained units, adaptable for any installation. They are furnished with 18" diameter roll up to 48" wide, and 24" or 30" diameter roll up to 60" wide. Crushing plate is quickly and easily adjusted to vary size of product. Roll and counter-shafts are carried on babbitted or self-aligning roller bearings. Investigate the possibilities of this machine for your operation.

WRITE today for Bulletin BB5112



McLANAHAN AND STONE CORPORATION

It, Mine and Quarry Equipment Headquarters . . . Since 1835 HOLLIDAYSBURG, PENNSYLVANIA

Dependable Products: Single and Double Roll—and Jaw Crushers, Crushing Plants, Reciprocating Plate and Apron Feeders, Rall Grizzlies, Conveyors, Elevators, Scraens, Scrubbers, Steel Log Washers, Sand Drags, Hoists, Jigs, Dry Pans, Dryers, Scrae Bundlers, Pulleys Geors, Bearings, Sprockets, Sheaves, Rollurs, Bin Gates, Elevator Buckets, Gratings, Car Wheels, Ferrous and Bronze Castings.



A Trabon Automatic Lubrication system installed on this shuttle car completely eliminated costly shutdowns. After 700 hours of operation, the car was torn down and every part was in perfect working condition.

Trabon Automatic Lubrication was responsible for its smooth, efficient operation. Each of the 70 bearing points had received the right amount of lubrication at the right time.

This performance is typical of the many installations in the mining industry in which bearings are being protected by a Trabon Automatic Lubrication System.

Bulletin 529 will give you more details.

Trabon Automatic Lubrication Fits Any Bearing Situation.



News Round-Up

News Briefs and Trends

West Kentucky Coal Co. To Negotiate With UMWA

The possibility that the West Kentucky Coal Co., Madisonville, Ky., one of the country's largest non-union operations, soon may make a contract with the UMWA was indicated by reports published in the press last month. According to the reports, Hooper Love, company president, announced Nov. 9 that he had been authorized by the board of directors to begin negotiations with the UMWA and that he had notified the company's independent union to that effect. Before discussions begin, however, the UMWA must show evidence that it represents a majority of the company's 950 employees. Since the UMWA is not eligible for a NLRB election, miners will be asked to sign authorizing cards, union officials said. Operated as non-union since its start in 1905, West Kentucky Coal has long been a major UMWA target. According to reports, a factor in the change is the friendship of John L. Lewis, UMWA head, and Cyrus Eaton, Cleveland industrialist. Mr. Eaton has acquired large stock interests in the company in the last year or so and both he and his son are members of the board of directors.

N&W To Test Coal-Burning Gas-Turbine Locomotive

A new-type coal-burning gas-turbine locomotive is scheduled to begin road tests soon, hauling freight on the lines of the Norfolk & Western Rv., it was reported last month. A 111-ft-long unit is completing preliminary tests at the Eddystone (Pa.) plant of the Baldwin-Lima-Hamilton Corp., after which the N&W is expected to give it 6 mo of trial operation. When finally perfected, the coal-burning gas-turbine type of locomotive, because of its higher efficiency and lower operating costs, is expected to go far in halting the dieselization of the Nation's railroads. The Locomotive Development Committee of Bituminous Coal Research, Inc., supported by both coal and railroad organizations, has been active for some time in the development of a design suitable for locomotive applica-

Anthracite Week Celebrated

Anthracite coal as the fuel of the future and its importance as a source of energy for industry and homes throughout the Nation was the theme of "Anthracite Week" starting Nov. 16. Observance included community-wide participation in the region in demonstrations, displays, contests, dinners, meetings and other events designed to illustrate the importance of anthracite's role, with various events and publicity scheduled throughout the state and Nation. As a part of the national publicity, "Miss Anthracite," Miss Lee Kosick of Dallas, Pa., appeared as a contestant on Herb Shriner's CBS-TV quiz show, "Two for the Money."

New Industry Group Formed to Sell Coal-Fired Equipment

Created with the objective of stopping the inroads of oil and gas by aggressively marketing coal and modern coal-burning equipment superior to any other means of heating, the newly formed Automatic Solid Fuels Equipment, Inc., 1001 South-eastern Ave., Indianapolis, is sponsored and supported by individual coal mining and shipping companies, coal retailers, the NCA, American Retail Coal Association and various local, state and regional groups. The organization will arrange for the manufacture and will

Six Meeting Reports In This Issue

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market and promote the sale of automatic solid-fuel equipment for domestic heating on a national basis through coal industry outlets. The first such unit announced is the "Campbell Stoker," said to be a "revolutionary new bituminous coal stoker providing a degree of automatic operation never before thought possible, plus an efficient garbage and waste incinerator . . . easily adaptable to practically every known type of heating system



Federal Mine Safety Review Board Now Complete

NEWLY CONSTITUTED Federal Coal Mine Safety Board of Review, shown in one of its first sessions in Washington early last month, consists of: Edwin R. Price (left) manager of coal properties, Inland Steel Co., Wheelwright, Ky., operators' representative; Edward Steidle, newly appointed chairman of the board, and Dean Emeritus of Penn State's School of Mineral Industries; and Charles R. Ferguson, safety director, UMWA, and mineworkers' representative. Mr. Steidle, Dean at Penn State from 1928 until his retirement this year and widely known throughout the industry, was sworn in Nov. 6 for a term expiring July 15, 1955, thus completing the membership of the three-man board. Messrs. Price and Ferguson were sworn in as board members at ceremonies in

at a lower cost than comparable units." Trade response and orders for the unit obtained from the preliminary announcement have been more than encouraging, reports indicate.

And For Your Information . . .

Mining of 150,000,000 tons of coal over an 83-yr period was achieved in October by the West Kentucky Coal Co., Madisonville, Ky. The output represents that of the West Kentucky Coal Co., established in 1905, and the St. Bernard Coal Co., formed in 1870 and acquired by West Kentucky in 1924. The company's reserves are more than twice the tonnage mined to date and are being increased constantly, Hooper Love, West Kentucky president, reported.

Surface rights to some 170 million acres of government-owned forest land may be affected by a decision on the request of the Stearns Coal & Lumber Co., Stearns, Ky., to strip-mine 500 to 1,000 acres in the Cumberland National Forest on which it owns mineral rights. The company sold 47,000 acres of cutover timberland to the National Forest in 1937, but retained the mineral rights. It has operated deep mines on the property and now seeks to strip a portion, It is expected that conservation and forest authorities will oppose the request.

One of the oldest mines in the country, the 146-yr-old Washington colliery, Plymouth, Pa., has been closed, the Glen Alden Coal Co. announced last month. The colliery was opened in 1807 by Abijah Smith on 75 acres of land. According to early records, miners then were paid 75c a day and mined an average of 1½ tons. Coal was sold for \$10 a ton, with a profit of \$4 a ton.

The 13-yr receivership of the Elk Horn Coal Corp., Fleming, Ky., has been ended, with a final order entered in the Letcher County Circuit Court, Whitesburg, Ky., last month. The company is being reorganized under a plan approved by stockholders and the Ohio County Circuit Court in West Virginia.

Two tipple fires reported early last month resulted in the closing of one mine in West Virginia and three in Virginia. In Logan County, West Virginia, fire of undetermined origin destroyed the Big Creek tipple of the Merrill Coal Co. Nov. 3, with a loss estimated at \$200,000. Near Grundy, Va., a tipple of the Buchanan County Coal Co. was destroyed Nov. 8. Cause of the fire and the damage was not immediately determinable, but company officials said that the three mechanized mines served by it would be closed for some time.

The go-ahead for the hydroelectric power phase of the St. Lawrence Seaway project was provided by President Eisenhower Nov. 5 in an executive order permitting the State of New York to join with the Province of Ontario in building the facility. However, immediate work on the project is expected to be held up by an appeal against the FPC, filed in the U. S. Court of Appeals by a group that includes the Central Pennsylvania Coal Producers' Association.



Wide World Photo

Gargantuan Stripper Pitches In

ONE OF THE LARGEST DREDGING MACHINES in the Ruhr mining district of Germany, this unit recently was put in operation for strip-mining coal. The unit weighs 1,400 tons and has a digging capacity of 35,300 cubic feet per hour. Wheel and bucket excavators of similar type used in Germany also have been built there for operation in Australia.

Anthracite Committee for Expanded Research

The Anthracite Advisory Committee to the Secretary of the Interior has recommended continuing and expanding the Bureau of Mines anthracite research and development program, Secretary Douglas McKay announced Nov. 10.

The committee also emphasized the importance of the study the Bureau is completing of the anthracite mine-flood problem, and suggested that immediate financial assistance be recommended for the industry in bearing the high cost of pumping water to keep mines active.

As authorized by Congress, Mr. Mc-Kay recently appointed the 6-man advisory committee on which anthracite mine operators, mineworkers and the public are equally represented. The committee advises the Secretary, at his request, on work centered at the USBM Anthracite Research Laboratory in Schuylkill Haven, Pa., on health and safety in mining operations and on other problems of the region.

USBM Director J. J. Forbes called a meeting recently at the Schuylkill Haven laboratory where the committee drew up, for the secretary's consideration, specific recommendations for research and development work on mechanized mining, preparation, and utilization of anthracite by the Bureau. They are:

MECHANIZATION

 Continue work with the German shearing machines and coal planer where cooperative opportunities are offered.

Continue design and development of the large-diameter borehole drill in cooperation with contributing anthracite operating companies.

3. Continue projects on induced-

caving methods with companies interested in this type of mining.

 Continue research on high-speed, high-bit-pressure drills.

PREPARATION

 Continue crushing and grinding studies with various types of crushers, such as gyratory, hammermill, etc.

Continue work on various preparation methods, particularly on use of the launder screen and the Humphrey spiral.

UTILIZATION

- 1. Actively proceed with studies of the use of anthracite in metallurgy:
 - a. Cupola.
 - b. Blast-furnace admixture.
 - Blending in by-product coke production.
 - d. Advance design of blast furnace for exclusive use of anthracite.
- Continue studies on the use of anthracite in crop drying and frost control.
- Continue research on industrial uses of anthracite producer gas.
- Continue to study the possibility of recovering germanium from anthracite.

Members of the Anthracite Advisory Committee are: E. G. Fox, president, Philadelphia & Reading Coal & Iron Co.; C. A. Gibbons, vice president, Susquehanna Collieries Div., The M. A. Hanna Co.; August J. Lippi, president, District 1, UMWA; Joseph T. Kershetsky, president, District 9, UMWA; O. E. McGregor, chairman, Anthracite Committee, Scranton Chamber of Commerce; and E. G. Bailey, director and consultant, Babcock & Wileox Co.

IC STORIES HIGH!

Three new B-I-G boilers on the West Coast will have all of the cost-saving advantages of B-L tube-supported wall enclosures and Texad* finishes. The order for one of them—a 1,250,000-pound-per-hour unit—has just been placed. Construction on the others—850,000-pound-per-hour boilers is now being started.

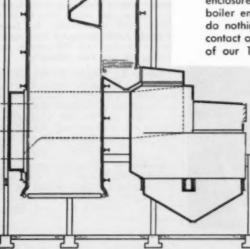
That means they'll cost less, save steel, operate more efficiently.

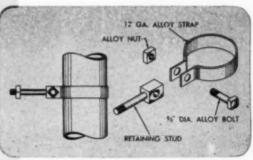
Those same advantages can be earned by specifying Bigelow-Liptak suspended settings for any large size industrial or public utility boiler. In California, for example, the king-sized, 10-story boilers will have lower construction and material costs and will not need tough-to-get steel plate.

Enclosures will be tighter, too. Tube-supported walls breathe with the boiler movements and TEXAD* flexes itself right along with boiler expansion—something that a steel plate casing that large could never do.

If you are building a large boiler, or a small one, insist on a separate enclosure quotation. You'll save plenty and you'll get a specially-made boiler enclosure engineered for your particular furnace by people who do nothing else but build furnace enclosures. Write Detroit today, or contact one of our conveniently-located offices. Be sure to ask for a copy of our 12-page tube-supported wall catalog—and a TEXAD* folder.

T. M. REG.





One method B-L uses to fasten the enclosure to the tubes without welding into the tube. Tile-supporting castings are hung on the studs.

1133



BIGELOW-LIPTAK Corporation

and Bigelow-Liptak Export Corporation
2550 W. GRAND BLVD. • DETROIT 8, MICHIGAN

UNIT-SUSPENDED WALLS AND ARCHES

In Canada: Bigelow-Liptak of Canada, Ltd., Peranto. Ontario

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Personal Notes

Archibald Miller, since 1933 superintendent of Cairnbrook operations, Loyal Hanna Coal & Coke Co., has retired after 51 yr of service with the company. At a testimonial dinner, Oct. 30, attended by more than 80 fellow employees and officials of the company, Mr. Miller was presented with a television set. H. Dewey Schminky, assistant to Mr. Miller since 1942, has been named to succeed him.

1. Walter Hurley has been named vice president in charge of production for North American Coal & Dock Co., a subsidiary of North American Coal Corp. Starting his coal mining career at the age of 13, Mr. Hurley has had 40 yr of experience in all phases of mining operation and administration in the West Virginia coal mines. Prior to his appointment, he served as general superintendent of C. H. Mead Coal Co., a subsidiary of North American. Other personnel changes announced following the resignation of A. J. Ruffini, executive vice president, North American Coal Corp., included the election of E. F. Maurer, general manager. Powhatan deep mines, as vice president in charge of production, Powhatan Mining Co. Roy W. Fox, general superintendent, Powhatan deep mines, was appointed consulting engineer, North American Coal Corp. and its subsidiaries, with headquarters in Cleveland. C. G. Evans, general superintendent, Red Parrot Coal Co. mines, Prenter, W. Va., has been named personnel manager of North American and its subsidiaries, with offices in Cleveland.

Other changes in personnel of the company and its operating subsidiaries were: Robert A. Maurer, formerly associated with Pittsburgh Consolidation Coal Co., named assistant to Henry G. Schmidt, president, North American; Emmett T. Lang, industrial engineer, Powhatan Mining Co., named efficiency engineer for North American and its subsidiaries; James H. Hurley, safety director, Red Parrot Coal Co., named to assist Mr. Lang: Felix A. McParland, general outside foreman, made general superintendent, Powhatan Mining Co., acting in the absence of Mr. Maurer. Michael Yonko, general mine foreman, Powhatan No. 3 mine, was appointed inside superin-tendent, Powhatan No. 1 mine, succeeding Charles E. Young, resigned. Raymond Rogers, superintendent, Red Cedar mine, Red Parrot Coal Co., was named chief electrical engineer for American and its subsidiaries, Mason Morgan, assistant to the general superintendent, Prenter No. 2 and 5 mines, has been named outside superintendent, Red Parrot Coal Co. W. L. Harley, tipple foreman, Red Parrot Coal Co.'s Red Cedar mine, has been named outside superintendent of that mine. Thurmond R. Miller, night foreman, Red Parrot No. 5 mine, has been made day-shift inside

Co., succeeding Mr. Hurley. Carl Morgan, general mine foreman, No. 5 mine, Red Parrot Coal Co., has been transferred to C. H. Mead Coal Co. as inside superintendent. W. R. Stevens, assistant superintendent, has been named safety director, C. H. Mead Coal Co., succeeding Mr. Stanley.

Capt. William A. Laird, superintendent, Olga No. 1 mine, Olga Coal Co., Coalwood, W. Va., has retired. He has served in various supervisory and administrative capacities with Olga and its predecessors since 1919. Homer Hickam.

general foreman. Edgar Stanley, safety

director, C. H. Mead Coal Co., has been named safety director, Red Parrot Coal

dent, Olga No. 1 mine, Olga Coal Co., Coalwood, W. Va., has retired. He has served in various supervisory and administrative capacities with Olga and its predecessors since 1919. Homer Hickam, mine foreman at Olga No. 1 mine for several years, has been named to succeed Capt. Laird. Coy Allen, assistant to superintendent, succeeds Mr. Hickam as mine foreman. Clarence Hickam has been named mine foreman, Olga No. 2 mine, succeeding Cody C. Clark, resigned. C. M. Fitzgerald, machine-shop foreman, and W. Gordon Mason, personnel manager, have retired from active service with the company. Mr. Fitzgerald joined Olga in 1922, and Mr. Mason, in 1916.

Earl Klees, chief safety engineer, Philadelphia & Reading Coal & Iron Co., has been named superintendent, Maple Hill colliery, succeeding Norman Harrison, assigned other duties with the company. George A. Brecker, explosives engineer, will assume the duties as chief safety engineer in addition to his other work, with the title of chief safety engineer. George Yentsch, outside foreman, Locust Gap colliery, has retired after 61 yr of service, and is succeeded by James Williard. Leslie Stroup has been named outside foreman, Oak Hill colliery, succeeding the late Fred Gilmartin.

Edwin L. Wilson, director of research, The Lehigh Navigation Coal Co., has retired to set up his own business as fuel engineering consultant. Before joining Lehigh in 1928, Mr. Willson held engineering positions with the Hazard Mfg. Co. and Connecticut Electric Steel Co.

Leonard J. Timms has been named assistant to the vice president, New River & Pocahontas Consolidated Coal Co. He was formerly assistant to the president, Premier Pocahontas Co. and Eastern Coal Corp.

James R. Garvey, since 1948 with the Columbus branch, has been named supervising engineer of that branch of Bituminous Coal Research, Inc. John W. Igoe, technical editor in charge of publications for the past 6 yr, has been named director of information. Paul McCloskey has been appointed assistant to the director at the Pittsburgh branch. Prior to joining BCR, Mr. McCloskey was associated with Reuter & Bragdon, Inc.

NEWS of your company, personnel changes and other activities, are interesting to other Coal Age readers, so why not make it a point to tell us about them. Write The Editor, Coal Age, 330 W. 42 St., New York 36, N. Y.





Union Pacific Honors Retiring Officials

SOME 40 OFFICIALS of The Union Pacific Coal Co. attended a dinner in Rock Springs, Wyo., Oct. 17, to pay tribute to William Wilkes (left), mine superintendent, and John Sorbie, section foreman, Rock Springs operations, who recently retired on pension after many years with the company. Born in England, Mr. Wilkes came to the U. S. at an early age and entered the UP mines in 1902 at the age of 15. He was made mine superintendent of the Winton District in 1943, transferring to Superior in 1948 and to Rock Springs the following

year. Justly proud of his safety record, Mr. Wilkes received a silver medal from the Joseph A. Holmes Safety Association for his part in a rescue operation. The Winton mines under his supervision won the Sentinels of Safety Award for 1947 and other properties received various Holmes awards. Mr. Sorbie went to work for Union Pacific immediately on coming to America from Scotland in 1914 and was made a foreman a year later. Except from 1917 to 1924, he worked for the company continuously and in his 57 yr in mining never had a lost-time accident.

Smooth Collection Assured

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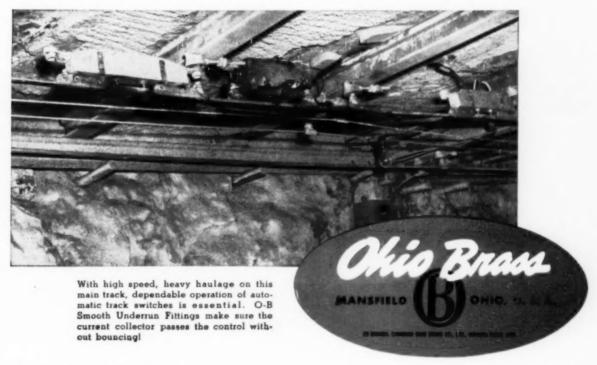
Collectors hug wire held with O-B Smooth Underrun Fittings

Where smooth current collection is essential, use O-B Smooth Underrun Fittings. That's what was done in this high-speed haulage system to insure dependable track switch operation! O-B Type-T Section Insulators and O-B Bulldog Trolley Wire Clamps flank electrical controls in the overhead which govern track switch settings. These controls are operated by the locomotive current collectors as they pass. Since shoes zip past the O-B Fittings without a bit of bouncing, they ride smoothly as they

pass the control, and proper track switch operation is certain.

Just as important are the other O-B Smooth Underrun Fittings used throughout this heavy-duty haulage system to assure long wire life and long collector life. They prevent bumping and arcing; thus there is no burning to steal life from wires or collectors.

For wire-hugging, burn-free current collector action, safeguard your haulage system with O-B Smooth Underrun Fittings!



Obituaries



Carl Schotz

Carl Scholz, 81, consulting engineer for the Elk River Coal & Lumber Co. and former president of the American Mining Congress, died Nov. 15 at his home in Charleston, W. Va., following an illness of 2 wk. A native of Germany, Mr. Scholz came to America in 1889 and entered the mining industry in the Charleston area. At one time he served as manager of the fuel and mining department of the Rock Island R.R. In his earlier days he also visited Europe to study min.ng conditions as an engineer for the USBM.

William E. Davis, 76, president, Old King Mining Co., and Kentucky Sun Mining Co., Tribbey, Ky., died Nov. 2 in a Lexington, Ky., hospital. Active in the coal-m.ning industry for more than 50 yr, Mr. Davis entered the coal business with his father in 1900, becoming manager of the East Tennessee Coal Co.'s operations at Jellico, Tenn. He was instrumental in the development of the Hazard coal field in Perry County. A resident of Lexington, Ky., for the past 2 yr, Mr. Davis was also vice president of the Midland Mining Co.

E. S. Hamilton, 59, general superintendent and general manager, Norfolk & Western Ry.'s mining division, Williamson, W. Va., died Oct. 30, in Sarasota, Fla., after an extended illness. Associated with Norfolk & Western since 1923, he had headed the mining department since August, 1952, and was recently reelected a director of the Coal Operators' Association of Williamson Field.

Joseph C. Bischof, 39, an engineer for the Peabody Coal Co., Pana, Ill., was killed Oct. 26, in a collision of two mine motors at Peabody No. 17 mine, in which three other miners were injured. Mr. Bischof has been associated with Peabody since 1943.

Jesse V. Sullivan, 69, executive secretary of the West Virginia Coal Association for many years, died Nov. 20 in Charleston, W. Va. Widely known throughout the industry, Mr. Sullivan had been connected with the association for some 30 yr before his retirement in 1951.

Chicago Meeting "Kicks-Off" Oil Campaign Renewal

"Kick-off" of an energetic renewal of the campaign for federal legislation to restrict the import of residual oil has been scheduled for a general meeting at the Palmer House on Chicago, Dec. 11, under the sponsorship of the Foreign Oil Policy Committee, with R. E. Snoberger as chairman. The meeting will mark the public resumption of the foreign-oil battle and everyone interested in the coal industry, directly or indirectly, is encouraged to participate. The Foreign Oil Policy Committee, composed of representatives of the coal industry, independent oil producers, labor and other groups, originally was formed to carry the fight to the last session of Congress.



AMONG SAFETY LEADERS at Reliance No. 7 mine are: Robert Ghormley (left), mine safety committee; Andrew Spence, mine foreman; Lawrence Walsh, mine superintendent; and Leon Wisniewski, mine safety committee, shown after a regular inspection of the property.



BOOSTERS FOR SAFE OPERATION at Stansbury No. 3 seam include: Henry Welsh (left), mine safety committee; J. T. Watson, mine superintendent; Ernest Besso, mine foreman; and Harold Clark, mine safety committee, as they leave mine after safety inspection.

Two UP Mines Cited for Safety Performances

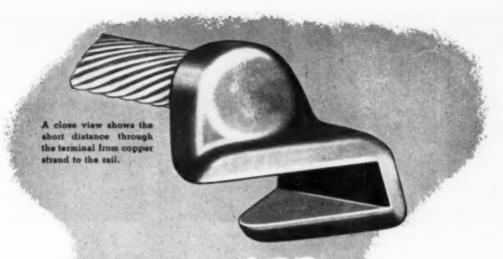
THE NATIONAL SAFETY COUNCIL, through its president, Ned H. Dearborn, recently presented two awards to mines of The Union Pacific Coal Co., Rock Springs, Wyo., as follows:

Award of Merit to the Reliance (Wyo.) No. 7 mine for operating 2,055,131 manhours without a disabling injury, from Jan. 1, 1948, to Dec. 31, 1952.

Certificate of Commendation to the Stansbury (Wyo.) No. 3 seam for operating 483,774 man-hours without a disabling injury, from Nov. 6, 1951, to Dec. 31, 1952

In accepting the awards, I. N. Bayless, president, Union Pacific Coal, pointed to the performance of Reliance employees as a world's safety record which "should go to prove, of course, that persistent effort will get results." In their 19 yr of enrollment in the National Safety Competition sponsored by the USBM, UP

mines have won the Sentinels of Safety Trophy 13 times, Mr. Bayless noted. Reliance No. 7, with its accident-free record, won the Trophy for four consecutive years from 1948 to 1951. The company's mines worked a total of 3,719,243 manhours in 1952, sustaining 19 lost-time injuries for a mark of 195,750 manhours per injury. One fatality occurred in this period while mining 3,465,495 tons of coal



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Terminal shape shows another advantage for easy welding. Note the bevel on the terminal edges. This bevel makes a wide angle between the rail base surface and the terminal, and creates an open welding area that is readily reached with welding rod.

Shape provides this O-B AW-22 Rail Bond with a third visible, important advantage—a truly short rail-to-copper electrical path. Bond strand welded to the outer face of the terminal is just as close as possible to the weld that joins terminal and rail together.

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AW-22 Bonds made for over-or under-base installation.

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SPEAKERS AT THE FALL DINNER MEETING of the Anthracite Section, AIME: H. H. Otto (left), assistant general manager, The Hudson Coal Co.; Wesley Stonebraker, superintendent, Olyphant colliery, The Hudson Coal Co.; Norman Becker, supt. of collieries, Glen Alden Coal Co.; Charles Kuebler, asst. mining engineer, Lehigh Navigation Coal Co.

Anthracite AIME Views Roof Support

RECENT PROGRESS in roof-support methods in anthracite mining was the theme at the fall meeting of the Anthracite Section, AIME, held at the Scranton Club, Scranton, Pa., Oct. 28. Over 225 members and guests attended the dinner meeting.

Edward G. Fox, president, The Philadelphia & Reading Coal & Iron Co., welcomed the group and introduced noted guests and past presidents. Speakers and their subjects were Harry Otto, assistant general manager, The Hudson Coal Co., "Brief History of Timbering"; Wesley Stonebraker, superintendent, Olyphant colliery, The Hudson Coal Co., "Roof-Bolting at Hudson Coal Co., "Roof-Bolting at Hudson Coal Co.," in Norman Becker, district superintendent, Glen Alden Coal Co., "Collapsible Props"; and Charles Kuebler, assistant mining engineer, Lehigh Navigation Coal Co., "Full Ring Yielding Member Steel Timber." Chairmen of the session was Francis Sterner, mining engineer, Lehigh Navigation Coal Co.

TIMBERING HISTORY

In giving a brief history of timbering. Mr. Otto began with methods used early in the 19th Century and recalled many more recent personal experiences with timbers measuring 24 to 36 in in diameter. No special tools were available for handling these and, as a result, installation time was high and great human effort was required. Mr. Otto emphasized that just as timbering in the early days presented a great challenge to mining men, so it does today. The key to successful timbering lies in making a study of each place to be timbered and then selecting the best method possible for the particular job, Mr. Otto added. The first steel timbers were used at the No. 40 slope at the Hazel operation of Lehigh Valley in 1889. It was followed by other installations, such as, that at Maxwell colliery in 1908, which in turn was followed by other types INDUSTRY MEETING — A Special COAL AGE Staff-Written Report

such as, liner plates and collapsible steel props. These were supplemented by similar units from abroad and considerable experimental work was done with the steel supports. The success of steel-arch supports and lining depends upon the thoroughness of the packing behind them, Mr. Otto explained. Another support receiving attention and tests is the aluminum collapsible prop.

ROOF-BOLTING

The success of roof-bolting depends upon either secure anchoring of the bolt in strong roof or binding the layers of rock together to form a beam strong enough to support the overlying strata, Mr. Stonebraker explained.

Tracing history of roof-bolting from its beginning in the St. Joseph area, through the first application in bituminous coal mining at the No. 7 mine of the Consolidated Coal Co. in Illinois, Mr. Stone-braker pointed out that the benefits were increased safety and greater production. The USBM became interested in the method and co-operated closely with coal companies in application of the new method. By 1949, a total of 114 coal mines had either begun bolting or had ordered materials to do so.

Spurred by the previous successes in bituminous mining, The Hudson Coal Co. ordered both wedge and expansion-shell bolts for experimental work, along with suitable bolting equipment. Since Pennsylvania regulations do not permit experimental installations of bolts in an active area, an old haulage entry was selected for the experiment. The entry selected was in the Dunmore 4 vein, which averaged 6 ft thick, had a strong shale roof and lay 735 ft below the surface.

In October, 1949, bolting, using 5-ft bolts set on 4-ft centers, was started. Bolts were tightened to between 300 and 500 ft-lb of torque and were subjected to periodic inspection and torque tests. Results showed that there was an average decrease of 105 ft-lb of torque in wedge-type bolts and about 135 ft-lb decrease in the expansion-shell type. Bolts were retightened but torque continued to decrease. Continued inspection showed failure of many expansion-shell bolts and a few of the wedge-type.

Since the first installation, experimental work has been conducted on bolt design. Many pull tests were made to determine how well each type was holding. Another result of the experimental work was that the hole diameter was found to be a critical factor in getting good anchorage, Mr. Stonebraker added.

Bolting was extended beyond the initial area and about 100,000 sq ft of roof has been bolted with 5- and 6-ft bolts. Bolts and roof have remained intact even though coal ribs and timbers have broken. Adjoining areas, timbered by conventional methods, were caved, Mr. Stonebraker pointed out.

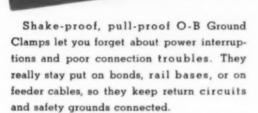
COLLAPSIBLE PROPS

First sight of the collapsible propleft some doubt as to whether it could be applied successfully, Mr. Becker said. However, 400 props were bought for experimental use in the Ross vein at Glen Alden Coal Co.'s Nottingham colliery, Plymouth, Pa. Each prop cost \$58 and special aluminum cap pieces were available for \$60 each. To reduce the capital expenditure required, 40-lb rail was substituted for the aluminum cap pieces.

The Ross vein at Nottingham is 8 to 10 ft thick, lies on an 8- to 12-deg pitch and is overlain by 5 to 6 ft of sandy slate. The area selected for the experiment had 300 to 400 ft of cover.

The collapsible prop consists of an



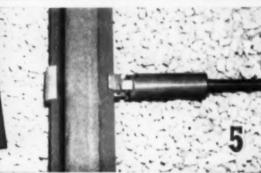


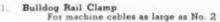
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 Available in three sizes, to grip feeder cables from 4/0 to 1,000,000 cir. mils.

 For machine cables as large as No. 1.
- 5. Mine Rail Clamp For machine cables as large as No. 2.





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Twin Disc Friction Power Toke-Offs on Cummins-powered Bay City Shovel (2); Caterpillar-powered Universal Jaw Crusher (3) and Universal Hammer Mill (4); and on Minneapolis-Moline-powered Pioneer Roll Crusher (5).

Twin Disc HYDRO-SHEAVE® Drives on Stoneridge-built horizontal conveyor (8); Simplicity Vibrating Screen (9); Pioneer Vibrating Screen (10); and Stoneridgebuilt Conveyor (11).

Twin Disc Hydraulic Coupling on Herculespowered generator plant (12).

Twin Disc Friction Clutches (two each) on Nelson P-10 Loader (6, 7; not shown); and Nelson P-11 Loader (13, 14).



TWIN DISC

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upper member that telescopes into a lower member having a bearing-plate base. To make units suitable for use anywhere in the vein, 18- to 30-in extensions were welded onto the bottom sections. The two sections are connected by a double-yoke strap made of tool spring steel which holds a steel grip shoe tightly against the upper member when the prop is set. Each support has 45 to 50 tons resistance to yielding when tight, Mr. Becker explained.

Props are hitched into the bottom to prevent dislodging and are preloaded when set. Load cells, furnished by the USBM, are attached to the props to measure the loads continuously. Each prop supports 26 sq ft of roof and cap pieces are tied together with short chains to prevent complete dislodging should a prop be set improperly. All supports are recovered and the mined area is backfilled. A tugger hoist is used to pull the props from the mined area when extraction is completed.

Benefits from the props, Mr. Becker said, are: increased safety: no changing of timbers is necessary; after periods of idleness, workers can return to the area immediately; no wood timbers are needed; 38.3% less time is required for timbering; production is increased 39%; recovery of coal is increased over 11%; and 40% more backfill can be put in the mined area.

FULL-RING YIELDING TIMBER

Full-ring yielding-member steel timbers have been installed at the No. 9 colliery of the Lehigh Navigation Coal Co. at Coaldale, Pa., in a squeezed section where timbering was costly and did not support the roof. The type of steel timbers selected for the job is similar to that used in Germany and was manufactured by the Herold Mfg. Co. of Scranton, Pa., Mr. Kuebler reported.

The area in which the steel timbers were installed was driven in 1937 and showed evidence of squeeze 10 yr later. In an effort to stop the squeeze, 18-in timbers were set. Large timber crews were assigned to keeping the tunnel open but were unable to do so all the time. Track and haulage difficulties resulting from bottom heaving compounded the maintenance problem Mr. Kuebler added.

The company worked with the USBM and the manufacturer to develop the steel ring supports as a solution to the roof-control problem. Each ring is made of curved segments that slide when the ring is subjected to 25 to 30 tons of pressure. Rings are bell shaped in cross-section and are similar to the German product.

Seventy-five sets of rings were installed on 2-ft centers with 40-lb steel rail used as lagging between the rings. The remaining space behind the installed rings was then packed with rock. Since the date of installation some rings have yielded up to 4 in. Uniform sliding of support joints is important, Mr. Kuebler emphasized. To date the rings are doing an excellent job and regular checks and measurements are being made to obtain engineering data.

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SAFETY AND COAL FOR KILOWATTS-M. B. Covell (left), Union Electric Co. of Missouri; Murrell Reak, Illinois Dept. of Mines and Minerals; and William W. Bolt, retiring institute president and session leader.



BELT FIRES AND ROOF-BOLTING-J. W. McDonald (left), Old Ben Coal Corp., session chairman and new institute vice president; W. C. Campbell, Old Ben Coal Corp.: and Gene Traxler, the B. F. Goodrich Rubber Co.

Mining and Utilization Illinois Themes

Roof falls, explosons, belt fires, coal for utilities, stripping, and bolting to facilitate re-opening old entries discussed at 61st meeting of the Illinois Mining Institute.

MINE SAFETY and belt fires, coal for kilowatts, strip mining, and reclamation of abandoned works through roof-bolting were the themes of the 61st annual meeting of the Illinois Mining Institute. Springfield, Ill., Nov. 6. In its business session, institute members chose Harold L. Walker as their next president, succeeding William W. Bolt, and heard a report on mining education and scholarships offered by the institute and individual coal companies. At the annual dinner, Dr. Kenneth McFarland, of Topeka, Kan., spoke on "Lifting Our Sights."

Eleven scholarships for mining at the University of Illinois are now offered by the institute and coal and equipment companies and individuals, reported W. K. Chedsey, professor of mining engineering, as follows: Old Ben Coal Corp.; Peabody Coal Co.; Henry A. Petter Supply Co.; Alfred E. Pickard; Northern Illinois Coal Corp.; and the Sahara Coal Co. In commenting on the situation in mining engineering training, Prof. Chedsey declared that a major need was more evidence of interest in students on the part of coal companies to prevent loss of morale and also loss of these men to other industries, including oil. His comments were seconded by M. D. Cooper, head of the educational division of the National Coal Association.

SAFETY PROBLEMS

With Mr. Bolt presiding, the initial technical session was opened by a discussion of major mining hazards and

methods of minimizing them by Murrell Reak, assistant director, Illinois Department of Mines and Minerals, Springfield. Roof falls, said Mr. Reak, remain as the No. 1 killer in Illinois and have claimed 12 lives so far this year. Offering specific recommendations for action by both men and management, Mr. Reak emphasized the need of preventing exposure of men to unsupported roof and with it the need for training in accident prevention. "It seems," he declared, "after studying all fatal accident reports that we are relying



NEW PRESIDENT-Harold L. Walker (left), with B. E. Schonthal, re-elected to his 25th term as secretary-treasurer of the Illinois Mining Institute.

too much on roof testing rather than roof support.

Enjoining inspectors, supervisors and men all to put roof falls foremost in their thinking, Mr. Reak pointed out that "training, education and establishment of good relations among all engaged in the mining industry are separably linked with health and safety in the mines . . . We admit that safety consciousness is of great value. However, consciousness alone will not prevent accidents any more than a safety poster or a safety slogan will, as they merely tell employees to be safe but do not insure that they know how to perform their work safely. Some experts on industrial safety advocate that effectiveness in accident prevention is almost entirely a function of the operating officials, and that responsibility for the safety of the workers falls directly on the shoulders of the immediate supervisor." But the man himself can help materially by accepting the need for working safely and guarding his fellows.

Turning to explosions, Mr. Reak emphasized the need of preventing gas accumulations, since the ignition of such accumulations is what usually starts explosions. The hazards of rubber belts, including fires, were Mr. Reak's third major topic. Until truly fireproof belts are developed, fire protection is essential, along with action to minimize all the other hazards that may be encountered in belt operation. Twelve suggestions for belt safety concluded

Mr. Reak's presentation.

COAL FOR KILOWATTS

The electric utility industry has become coal's largest customer in recent years, said M. B. Covell, superintendent of supply service, Union Electric Co. of Missouri, St. Louis. "A sound long-range fuel supply premised on a healthy coal industry is of primary importance to the

electric utility industry."

The electric utility industry has experienced major growth and there is sound reason to expect equally rapid growth in the future. In the residential and farm home area, Mr. Covell pointed out, average annual use of electricity by domestic consumers was around 500 kwhr in 1929. It grew to 952 in 1940 and 2,169 in 1952. Wider use of appliances and other equipment, including the heat pump and air conditioning, as well as greater farm mechanization, provide a sound basis for concluding that average domestic use could go to 3,000 kwhr in 5 yr and 4,500 in 10 yr. compared to 2,100 at present.

In industry, said Mr. Covell, manufacturing, including mining, used 4.5 kwhr per man-hour in 1939. This increased 68% to 7.6 kwhr in 1952 and equally substantial rises are expected in the future. Various national studies indicate an increase in electricity use in the industrial and commercial area of 35 to 37% in the next 5 yr, and nearly 60% in the residential and rural area. "Combined, this means that we may expect an increase in kilowatt-hour sales of 43% over the present level. This and other comprehensive studies indicate a doubling of sales in about 10

"Lest this picture appear too rosy in terms of future markets for coal, I do call atteniton to the increased efficiencies in power generation which have gone hand in hand with this rapid growth . . . The new plants that are being brought into production currently are producing power for less than 10,000 Btu per kwhr. The national average of all capacity for 1951, the latest figure I have, is 13,600 Btu per net kilowatthour. It is obvious that such economy cannot be achieved overnight. Existing plants need to be modernized or retired. Consequently, although a large expansion of plants brings the average economy down faster, the outlook for coal can only be in the direction of substantially greater use by the utility industry.

As to how trends in utility plant design may affect coal mining, Mr. Covell stated that "a basic plant design can only be predicated on an ability to burn any coal that may be available within its economic supply area under all conceivable market conditions for

the life of the plant . .

"Manufacturers of equipment probably can produce, at a price, boilers that will successfully burn any grade of fuel you may name. Uppermost in the problems they will have to combat is the sensitivity of the unit to slagging. Consequently, any plant design must take into account the amount of ash, the character of the ash, and the amount of sulphur in the coal. Moisture in coal,

ILLINOIS OFFICERS

President-Harold L. Walker, consulting engineer, M & N Engineering Co., Alton, Ill., succeeding William W. Bolt.

Vice President-J. W. McDonald. vice president in charge of engineering, Old Ben Coal Corp., W. Frankfort, III.

Secretary-Treasurer-B. E. Schonthal, B. E. Schonthal & Co., Chicago, re-elected to his 25th term.

Executive Board-Stuart Colnen. Freeman Coal Mining Co.; J. S. Forman, Mt. Olive & Staunton Coal Co.: John R. Foster, Chicago, Wilmington & Franklin Coal Co.; E. E. Green, Midwest Utilities Coal Corp.: Lawrence Kiss, Superior Coal Co.; H. C. Livingston, Truex-Traer Coal Co.; George C. McFadden, Carmac Coal Co.; Moss Patterson, West Kentucky Coal Co.; R. H. Swallow, Fairview Collieries Corp.; H. D. Freeman, Peabody Coal Co.; Paul Halbersleben, Sahara Coal Co.; and B. H. Schull, Illinois Dept. of Mines & Minerals.

as always, is largely a simple problem of economics, although it has become more important in its effects on very fine coals, insofar as it complicates the problem of transport and feed within the plant, with attendant difficulties in maintaining efficient boiler operation.

"From these remarks I do not want you to conclude that better preparation is a must. We are particularly fortunate here in the great industrial Midwest area to have such substantial reserves of coal for power-plant use. These coals are quite satisfactory but it does seem clear that the balance of the over-all economic problem involved as the systems grow may result in better preparation at the mine to obtain optimum results, from the newer units now being constructed."

STRIPPING

"The Story of Coal Stripping" - a sound movie by the United Electric Coal Cos. - concluded the first session, emphasizing, in addition to actual stripping itself with modern equipment, the reclamation of stripped lands and the preparation of strip coal for the market.

BELT FIRES

"Only 12% of the coal-mine fires in the United States from 1950 to 1952 have been attributed partially to the results of conveyor-belt friction," said Gene Traxler, chief, flat-belt engineering department, The B. F. Goodrich Co., Akron, Ohio, in a discussion of beltconveyor fires and possible preventive

INDUSTRY MEETING -A Special COAL AGE Staff-Written Report

measures opening the second session, with J. W. McDonald, vice president in charge of engineering, Old Ben Coal Corp., W. Frankfort, Ill., presiding. As a result of study of fires here and abroad, Mr. Traxler continued, "it is our belief that rubber conveyor belts are rarely the primary cause of fires."

Data presented by Mr. Traxler indicated that the majority of belt fires result from stalled belts, with overheated idler rolls and rubbing against frames as other major though secondary causes. Study of the situation results in the conclusion that possible causes of belt

fires fall into five classes:

1. Belt stalls while idler pulley continues turning. 2. Sections torn off belt jam against lip of transfer chute while belt con-

tinues to run. 3. Return idlers jam.

4. Belt edges rub against frame.
5. Belt spreads fire from another SOUTCE

Heat from friction can also ignite coal dust and lubricants and thus start fires. Coverings with more fire resistance include polyvinyl ehloride and neoprene. Analyzing the advantages and disadvantages of each, Mr. Traxler com-

mented as follows:

Neoprene provides conveyor belting which should give as good service life as the standard grade of rubber now commonly in use for underground coal mines. If and when its flame-resistant qualities are proved in service, there may be the possibility of some of the present mining laws regarding belt conveyors being relaxed. This could reduce the mining cost sufficiently to equalize the slightly higher cost of neoprene belting.

Possible methods of reducing the chances for belt conveyor fires are:

1.. Flame-resistant belting.

2. High-grade well-lubricated idler bearings. 3. Conveyor design permitting good

housekeeping.

4. Maximum framework clearance to prevent edge rubbing.

5. Vulcanized splices where possible. 6. Good servicing and maintenance of conveyors.

7. All possible automatic safety de-

Types of automatic safety devices were listed by Mr. Traxler as follows:

1. Centrifugal switches actuated by helts.

2. Paddle switches in transfer chutes. 3. Emergency stop cords along full length of conveyors.

4. Automatic sprinkler and rock-dust-

ing equipment. 5. Thermal switches at discharge points.

6. Motor overload switches.

Self-aligning idlers to keep belts well trained. 8. Sequence starting and stopping of

successive belts.

"In our opinion," Mr. Traxler concluded, "There is little danger of beltconveyor fires with a standard rubber belt where good housekeeping and good maintenance are practiced and where



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EQUIPMENT APPROVALS

Seven approvals of permissible equipment were issued by the U. S. Bureau of Mines in October, as follows:

Lee-Norse Co.—Type U131-4 water-spray pump; 5-hp motor, 250 v, DC; Approval 2-958; Oct. 15.

J. H. Fletcher & Co.—Type DEAl double-duty roof-control drill; 20hp motor, 230 v, DC; Approval 2-959; Oct. 20.

Joy Mfg. Cc.—Type PLII-17RPE portable elevating conveyor; 15-hp motor, 250 v, DC; Approval 2-960; Oct. 21.

Joy Mfg. Co.—Type PL11-16PE portable elevating conveyor; 15-hp motor, 250 v. DC; Approval 2-961; Oct. 22.

Joy Mfg. Co.—Type U-179-76PE/F 15-in chain-conveyor drive unit; 15-hp motor, 230 and 500 v, DC; Approval 2-962/2-962A; Oct. 26.

Joy Mfg. Co.—Type WL808, Model 40, semi-portable air compressor; 40-hp motor, 250 v, DC; Approval 2-963; Oct. 28.

Ingersoll-Rand Co.—Model 758, Type 40, air compressor; 75-hp motor, 250 v, DC; Approval 2-964; Oct. 29.

the proper automatic safety devices are used. As a further safeguard against belt fires, some form of flame-resisting belting can be used."

ROOF BOLTING IN RECLAMATION

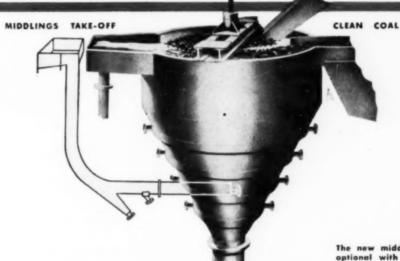
How roof-bolting made possible the safe and economical re-opening of a caved haulageway was described by W. C. Campbell, assistant to the vice president in charge of operations, Old Ben Coal Corp., W. Frankfort, Ill. The job involved cleaning up 4,175 ft of old haulageway at No. 22 mine. Average height of the fall was 7 ft; maximum, 28 ft. With conventional cleanup methods, the job would have been a sizeable one and might have been impracticable, Mr. Campbell noted.

The job was started in with RBD-30 bolting units and the first bolts were placed in late 1952. The work was done with the unit on top of the fallen material and it was selected with that use in mind. The rock was slabby and clearance of 41/2 to 5 ft permitted drill operation. Bolts were placed in accordance with conditions. Centers averaged no less than 31/2 to 4 ft. Expansion-shell bolts % in diameter were employed, and the length normally was 60 in, though some 108-in bolts were used in certain locations and some 36 and 48 in others. Creosoted 3x8x16-in wood headers were used over the plates, with 3x8-in by 16-ft creosoted planks at times when the supply of headers was interrupted.

The bolting crew consisted of two men, and the bolting unit was followed by a 460 loading machine, a battery **NEW 3-Product**

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locomotive and cars holding 7 tons of rock. The battery locomotive brought in supplies on its return trips. The entire bolting and cleanup crew normally consisted of two drillers, a loadingmachine operator and helper, and a motorman, with one-half the time of a bullgang boss.

Near the end of the job, the height of the cave decreased and then two bolting units were employed to stay ahead of the loader, which thus was always under well-secured roof. Since the mine was dry, the original track, which had been left in, was in good condition and served for the cleanup operation.

Bolting was begun in August, 1952, and no failures have yet occurred. Performance was summarized by Mr. Campbell as follows:

The cleaning and bolting operation took 132 shifts.

With an average of 6 men per shift, total man-shift was 792.

Bolts installed totalled 9,200.

Drilling was done with Carboloy rock bits, mostly in gray shale with some hard, black calcareous shale and occasionally boulders.

Eighteen bits were used per double shift.

Holes drilled per double shift varied from 33 in hard drilling to 144 in favorable material.

No lost-time injuries occurred.

Use of the bolting unit on top of the rock was a great time saver and safety factor.

If normal timbering and cleaning methods had been employed, cleanup would still be going on, whereas considerable coal has already been produced from the section.

A similar procedure is followed elsewhere with the exception of one area where good timbering with crossbars had reduced the caving. However, use of a larger car made it necessary to take out some legs. This was made possible by drilling and bolting through the existing crossbars, which were in good condition, using 3 or 4 bolts per bar. Removal of the legs had no effect on the top.

Concluding, Mr. Campbell pointed out that bolting reduced the cleanup hazard and provided a good saving. Falls were prevented and there was no need to load out extra rock as a result. Fewer men were required in the cleanup and timbering operation, and the problem of delivering supplies was greatly simplified.

Preparation facilities

Jeddo-Highland Coal Co., No. 5 Highland Breaker, Jeddo, Pa.—Contract closed with Wilmot Engineering Co. for one 7-ft Wilmot Hydrotator for No. 4 coal, feed capacity, 50 tph; one 16-ft Wilmot Hydrotator Classifier for No. 5 coal, feed capacity, 100 tph; and one Wilmot froth-flotation concentrating plant, including one 8-ft-diameter by 8-ft deep conditioner and one 6-cell No. 30 Denver Sub A flotation machine, to prepare 28-150-mesh anthracite at a feed of 50 tph.

With the Aid of This
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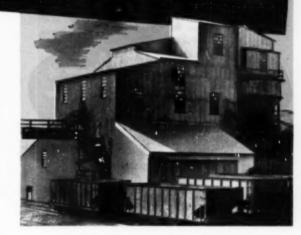


ow Wilmot's patented automatic controls are decreasing labor costs in coal preparation, and at the same time increasing the accuracy of quality control, is graphically illustrated by the 2-man anthracite fine coal plant at right. Two Wilmot Hydrotators and a Wilmot froth-flotation unit recover everything down to 100 mesh.

Installed at scores of bituminous and anthracite plants during the last four years, Wilmot Hydrotator coal cleaners equipped with the patented automatic controls have made impressive records in these 4 ways:
(1) improving market acceptance; (2) increasing percentage of yield; (3) increasing feed capacity without plant changes; and (4) cutting labor costs sharply.

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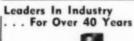
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COAL MEN ON THE JOB . . .

RED PARROT COAL CO., Prenter, W. Va. (left photo): Carl E. Morgan (left), general mine foreman, No. 5 mine; J. A. Gotbot, chief mining engineer; and James H. Hurley, assistant safety director.

ELECTRO METALLURGICAL CO., Alloy No. 2 mine, Alloy, W. Va. (right photo): Seated—F. E. Burger (left), superintendent: and J. E. Bloom, production engineer, junior. Standing— J. L. Workman (left), production engineer, junior; B. N. Trent, assistant mine foreman; and J. L. Knight, maintenance foreman.





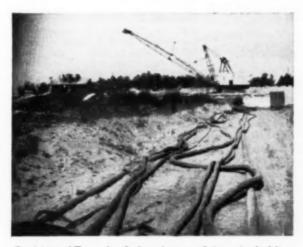
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New Developments

Fairview Coll. Buys Mine

The Minnebaha mine operated by the Little Betty Mining Corp., a subsidiary of the Hickory Grove Coal Mining Co., Terre Haute, Ind., has been acquired by the Fairview Collieries Corp., a subsidiary of Ayrshire Collieries Corp., Indianapolis. A deep operation, the property produces about 3,000 tpd and employs. 300 men. Republic Coal & Coke Co., Chicago, will continue to handle output from the mine.

W. Va. Property to Re-Open

Resumption of mining operations on the former property of the West Virginia Coal & Transportation Co., at West Columbia, W. Va., by the West Virginia Fuel Corp. was reported last month. Renovation of the plant, which has a capacity of 4,000 tpd, has been going on for some time, and the mine is expected to develop to an output of 40,000 tons within the next year, according to George Norvell Ir., superintendent. Augering and strip-mining equipment was scheduled to arrive before the end of the month and deep-mine operations also are expected to start shortly, it was said. Ura Swisher, Pomeroy, will be in charge of stripping operations. The company is under contract to supply coal to the Phillip Sporn power plant at Graham Station.

Maumee Opens New Stripping

Maumee Collieries Co., Terre Haute, Ind., opened Nov. 1 its newest property. Old Glory No. 33 mine, on the Upper Brazil Block seam. The operation is south of Coal City, Owen County, Ind., and is on the New York Central R. R. A new all-steel 5-track tipple, designed and built by company engineers, has a capacity of 2,000 tpd and is completely equipped for dry dedusting and crushing of coarse coal to screenings and stoker Mining equipment includes a 10-W Bucyrus-Erie dragfine with a 13-vd bucket and a Marion 480 loading shovel with a 31/2-yd bucket, both of which were used at Mine No. 17 at Clay City, which closed down on Sept. 15. In addition to the new Old Glory No. 33, Maumee is now operating four other properties: the Airline Mine No. 32 on No. 5 seam, opened last year; Chieftain Mine No. 20 on the No. 5 seam; Sullivan Mine No. 27 on the No. 7 seam; and Linton Mine No. 28 on the No. 4 seam.

Mining Firm Reorganizes

Reorganization of the Ashland Coal & Coke Co., Ashland, McDowell County, W. Va., and its merger with the Ashland Mining Corp., of Shamokin, Pa., was announced early last month. The new firm will have general offices in Bluefield and will take over all coal leases and mining operations. Ashland Coal & Coke, however, will continue its retail, real estate and other activities under that name. W. W. Walker, president of Ashland Coal & Coke, is president of the new organization, and W. C. McSherry, Frederic, Md., is vice president.

Elmhurst-Chicago Stone Company Report on J&L Jalloy Heat-Treated Plate:

"Twice the Wear ... No Downtime During Quarrying Season"

Faced with the problem of finding a long-lasting lining for their high-speed rock-crusher chutes, Elmhurst-Chicago Stone Company tried everything from rubber to high-carbon steel. Then, in 1949, J&L Jalloy Heat-Treated Plate was experimentally installed in 15% of the company chutes.

Today all worn out plates have been replaced with J&L Jalloy. Here's why. Jalloy lasted twice as long as the special abrasion-resistant steel chute liners previously used ... Jalloy lasted the entire quarrying season ... eliminated costly downtime for maintenance repairs. Finally, Elmhurst has taken further advantage of this modern J&L mining and quarrying steel by installing Jalloy liners in the company's truck beds.

If you have equipment like this that takes a real beating from impact and abrasion — J&L Jalloy Heat-Treated Plate can help you cut maintenance costs and increase service life.



One of the roll crushers. Its high speed introduced tough impact and abrasion problems which have been solved with Jäl Jalloy chute linings.

The 70-year-old quarry of Elmhurst-Chicago Stone Company.





RICHARD WILLIAMSON (left) master mechanic, Snow Hill Coal Corp.; George Stachura, underground superintendent, Orient No. 3 mine, CW&P; and Charles Purcell, director, Indiana Bureau of Mines and Mining.

Indiana Institute Views Safety and New Methods

DEVELOPMENT of ventilating fans, Bureau of Mines responsibility in administering Federal safety laws, continuous mining in the Midwest and improvements in mine safety were major topics discussed by more than 150 members of the Indiana Coal Mining Institute at Vincennes, Ind., Oct. 17.

At the business session of the institute, members adopted a resolution recognizing the important contributions of the late Harvey Cartwright in promoting and preserving the institute. Also, officers for the coming year were elected as follows:

President—J. W. Anstead, general superintendent, Linton Summit Coal Co., Terre Haute, Ind.

Vice Presidents — Harry Cruikshank, master mechanic, Viking Coal Co., Terre Haute; Alva Harris, general manager, Ingle Coal Co., Elberfeld, Ind.; and John A. Stachura, general superintendent, Enoco Collieries, Inc., Bruceville, Ind.

Executive Board — Placide Mayeur, general superintendent, Princeton Mining Co., Princeton, Ind.; Calvin B. Burk, chief engineer, Viking Coal Co.; V. S. Meister (retired) Jeffrey Mfg. Co., Terre Haute; Lon S. Ahlen, district manager, Goodman Mfg. Co., Terre Haute; A. G. Gossard, vice president and general manager, Snow Hill Coal Corp., Terre Haute; Carl Donie, general superintendent, Little Betty Mining Corp., Sullivan, Ind., and J. Q. Berta, general superintendent, Truax-Traer Coal Co., Terre Haute,

The one-day meeting closed with a banquet at which Rice Kello, vice president, Lockyear Business College, Evansville, Ind., was toastmaster, and Col. Jack Major, Paducah, Ky., the principal speaker. At the morning session, speakers were Peter Ambrosiani, ventilation engineer, Jeffrey Mfg. Co., Columbus, Ohio, and E. E. Quenon, chief, Vincennes branch, USBM. John Stachura presided at all sessions in the absence of Birch Brooks, vice president, Viking Coal Co., and retiring institute president.

In tracing the history of mine ventilation from dependence on natural ventilation, through heat-induced air currents to present-day mechanical fans, Mr. Ambrosiani pointed out that most

INDUSTRY MEETING — A Special COAL AGE Staff-Written Report

developments were of European origin until the late 19th century, when W. G. Montgomery designed the stepped, forward-curved multi-blade fan. Next important milestone was the propeller-type fan with a number of propeller stages on one shaft.

This was followed by development of pitch-adjustment controls for the propeller fans to permit changes in fan performance when mine expansion brought the fan to stall conditions.

In the meantime, design effort was concentrated on producing smaller fans for given capacity and in reducing losses in the fan assembly and housing. Development of the evase stack to limit shock losses in air leaving a fan is an example.

On exhaust vs. blowing systems, Mr. Ambrosiani pointed out that while the same fan may be used for either duty, erection costs will vary since an exhaust fan requires an adapter housing to connect with the airshaft. Furthermore, maintenance costs may be higher with an exhaust fan because of dust and corrosion. But safety is paramount, and most new installations are recommended for exhaust application.

In adding a second fan to a mine, all conditions must be carefully studied to insure most economical operation, Mr. Ambrosiani stated. As a specific example, one mine in West Virginia needed a new fan, and on first thought an exhaust fan like the one already in service was indicated. However, further study showed that a blowing fan on the new single-compartment airshaft could operate at 1½ in, wg. and the older fan at 2½ in, wg, exhausting. If both fans oper-



COAL MEN ON THE JOB . . .

WESTMORELAND COAL CO., Hampton Mines, Madison, W. Va., all section foremen except as noted: Front row—James E. Minton (left), Edward Justice, assistant general foreman, first shift; W. B. Coakley, W. P. Reynolds, and Sigel J. Tawney. Back row—E. F. Miller (left), vice president in charge of operations; James Coots, Jerry Wolford, assistant general mine foreman, second shift; C. J. Robinson, superintendent; M. H. Coffey, maint. foreman; D. W. Forinash.

Showin Em How in the "Show Me"State



STRIPPING OVERBURDEN 14 feet deep near Appleton City, Mo.

W. A. JOHANNIGMEIER, partner in the J. & Coal Company, speaks from experience when he says International crawlers beat 'em all in the

Missouri miner tells how International power means bigger profits on wintertime stripping job

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ated exhausting, the pressure would be 10 in at each fan.

Setting forth the attitude of the Bureau of Mines in administering federal codes, Mr. Quenon declared that it is not the Bureau's policy to force unreasonable issues on mine operators. But the most important factor in production at any mine is the group of mineworkers, Mr. Quenon stated, and the Bureau considers guarding the safety of the men as its fundamental mission.

Detailing features of the new code, Mr. Quenon pointed out that 6,000 cfm of air must pass through the last open crosscut or enter a pillar line, that air analysis must show at least 19.5% oxygen and less than 0.5% carbon monoxide, and that any mine showing 0.25% or more of methane will be classified as gassy.

When methane in the return is between 0.25% and 1.0% of the total volume, the mine will be cited in violation of the code but time for adjustment will be granted.

If the methane concentration is over 1.0%, immediate steps must be taken to get the concentration down to less than 1.0%, and if 1.5% methane shows up in the return, the men will be removed from the mine or section, Mr. Quenon stated.

With cold weather approaching, Mr. Quenon cautioned mine officials to keep rock-dusting up to effective levels and to remove excessive dust concentrations, since cold weather leads to excessive dryness underground.

At the afternoon session, speakers were George Stachura, underground superintendent, Orient No. 3 mine, Chicago, Wilmington & Franklin Coal Co., Waltonville, Ill.; Richard Williamson, master mechanic, Talleydale mine, Snow Hill Coal Corp., New Goshen, Ind.; and Charles Purcell, director, Indiana Bureau of Mines and Mining, Terre Haute.

Successful recovery of pillars in the Illinois No. 6 seam using Marietta and Joy continuous mining machines has been achieved at Orient No. 3 mine, Mr. Stachura reported. From 85 to 90% of the coal is recovered and roof breakage has been controlled in a manner that limits undue pressure on the coal. Furthermore, surface subsidence has not been evident and size consist of the continuous-miner coal is good. In 3 yr of pillar recovery by these methods there have been no lost-time injuries attributable to roof falls, Mr. Stachura pointed out.

In reporting on tests with continuous miners in the Indiana No. 3 seam, Mr. Williamson stated the machines could produce up to 75 tph, but bit costs were high because of the presence of pyrite lenses up to 2 in in thickness in some places. Average shift production was 250 tons with a 6-man crew. Roof control was good, Mr. Williamson said, and size-consist samples off the discharge boom of the rotary-head mining machine showed 14% plus 2-in coal, 14% minus 14-in and the remainder in the 2x%-in bracket.

"We have come a long way in 40 yr, both in working conditions and social standing in the community," Mr. Purcell



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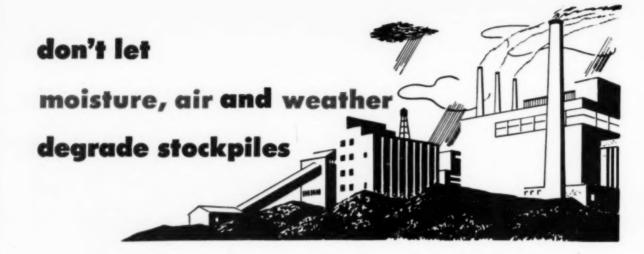


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declared, in recollecting his career in mining which began when he was 14 vr old. Better lighting, improved ventilation, safer transportation and better roof support have materially improved working conditions. The change from hand methods to mechanized mining demands a more intelligent man, one who merits the respect of his community. These changes for the better have been brought about through co-operation of everyone in the industry and through legislation, Mr. Purcell said, and though there has been marked improvement, there can be no complacency. With all our progress, we still have accidents because you cannot legislate a safe man. Vigilance on the part of all concerned and widespread safety training hold the best possibilities for further improvements in mine safety, Mr. Purcell concluded.

Moody Blames Government For Higher Coal Costs

Joseph E. Moody, president of the Southern Coal Producers' Association, blamed government interference in labor negotiations for many of the cost increases which are forcing coal to give up its markets to cheaper fuels, in a talk Nov. 6 before the 14th Annual Law Institute of the University of Tennessee, College of Law and its Alumni, at Knoxville, Tenn.

"Five times in the past 10 yr our mines have been seized by the federal government, and four of those times resulted in new contracts being signed by the government administrator and the union, every one calling for cost increases," Mr. Moody declared. "We then had the alternative of accepting the new contracts, or else not getting our properties back."

He pointed out that the coal industry, and particularly the southern bituminous industry, is in economic trouble today. due to constantly increasing costs of labor and freight. He recalled that the basic day rate for inside labor in the southern mines had increased from \$5.60 in 1941-which was above the national average even then-to \$19.67 for a 61/2hr work day now. In addition, he said, union members receive various fringe benefits, such as the 40c per ton welfare fund royalty, which has cost the operators more than a half billion dollars since 1946; paid lunch periods, paid vacations, etc., which bring the total cost to the operators for a man day's work to more than \$23.00.

"The mine operators knew full well when they signed the last several contracts for wage increases that they were endangering their ability to continue production and sell at a profit," he asserted. "In fact, they are selling at an over-all average loss per ton now in the southern fields. But, the Mine Workers' union, aided by the federal government and with the help of the northern bituminous operators, has been able to put their demands up to us on a 'take it or leave it' basis. We have had to either accept the terms they dictated, or stay closed down while the operators



in the north mined coal and seized all the markets that remained.

"We find it galling to realize that, while we have been struggling to maintain our economic life against the demands of the union and the refusal of the northern operators to cooperate with us, the federal government has time after time stepped in on the side of the union."

He charged that the government, along with the union, has consistently refused to recognize that coal is more expensive to mine in the deep mines of the south, because of lower tonnage production per man shift, and then costs more to ship to market because of the greater distances involved.

"Thus they have forced on us a single wage cost standard, which, together with other factors, is rapidly proving our ruin."

He pointed out also that freight rates for coal have been increased 14.6%—or \$1.15 per net ton—since 1948, and that although coal production and sales will be about 200,000,000 tons less this year than 5 yr ago, the railroads have consistently opposed any reduction in transportation costs. The ICC has sided with the railroads, he said, and recently extended the higher rates for another 2 yr.

These high rates mean that it costs up to \$1.50 or more a ton to ship to market from the southern mines than it does from those in the north, he said.

does from those in the north, he said.

"But the greatest and most damaging interference in our business by the federal government has come in the field of labor negotiations," Mr. Moody declared. He urged management and labor to bargain out their difficulties without intrusion by any third party.

Connolly Named Trustee For Anthracite Fund

Harry J. Connolly, chairman of the board, Pennsylvania Coal Co., last month was appointed industry member of the 3-man board of the Anthracite Health and Welfare Fund. Mr. Connolly succeeds Robert L. Birtley, president of the Hammond and Kohinoor coal companies, the original industry member of the board. Mr. Connolly was scheduled to leave for Germany Nov. 21 where he will serve as an industry delegate at a meeting of the Coal Mines Committee of the International Labor Organization. Also attending the meeting are Thomas Kennedy, international vice president, and Martin F. Brennan, president of District 7, UMWA.

State Instructor Named to Promote W. Va. Safety Groups

J. Martin Cook, Midway, W. Va., last month was appointed a safety instructor for the West Virginia Department of Mines to work in cooperation with the USBM to promote the Joseph A. Holmes Safety Association. Mr. Cook, who first started work in the mines at the age of 13, has had some 20 yr as a supervisor at mines in the Beckley area. His experience has included tipple foreman, chief electrician, section foreman and maintenance supervisor.

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GAS STORAGE UNDERGROUND and its danger to coal mines—E. C. Stump (left), W. B. Jamison, Arch J. Alexander and George R. Higinbotham. TRANSPORTATION BEHIND MINERS and rail-river-rail coal shipments (right photo)—

J. J. Foster (seated, left) and Morris Creditor; C. E.McWhorter (standing, left) and Charles R. Nailler.

W. Va. Institute and AIME Section Stage Joint Meeting Program

MARKETS AHEAD, including coal hydrogenation, gas storage underground in relation to coal mine safety, rail-river-rail coal transportation and a look into the future transportation behind continuous miners, were topics covered by six papers presented at the joint meeting of the Central Appalachian Section, AIME, and the West Virginia Coal Mining Institute, Nov. 6-7, at the Greenbrier Hotel, White Sulphur Springs, W. Va. Registration for the meeting was 188.

During the sessions, H. A. Quenon, division manager, low volatile mines, Eastern Gas & Fuel Associates, Beckley, was elected president of the West Virginia Coal Mining Institute; and George R. Higinbotham, president, Consolidation Coal Co. (W. Va.), Fairmont, was elected chairman of the Central Appalachian Section, AIME.

Arch J. Alexander, Union Coal & Coke Co., Charleston, retiring institute president, and G. R. Spindler, director, School of Mines, West Virginia University, and retiring chairman of the AIME Section, were present to steer the meetings. Chairmen of the technical sessions were Mr. Higinbotham; Charles E. Lawall, assistant vice president, C. & O. Ry., Huntington; J. E. Parker, superintendent of coal mines, Inland Steel Co., Wheelwright, Ky.; J. J. Foster, vice president, Island Creek Coal Co., Huntington; and Charles R. Nailler, president, Christopher Coal Co., Pursglove, W. Va. The program was arranged under chairmanship of Carel Robinson of Robinson & Robinson, Charleston.

At a luncheon presided over by Dr. Huston St. Clair, chairman of the board, Jewell Ridge Coal Corp., Tazewell, Va., A Special COAL AGE
Staff-Written Report

James Q. du Pont, administrative assistant, Public Relations Dept., E. I. du Pont de Nemours & Co., Wilmington, Del., and great-great grandson of the founder of the du Pont company, spoke on the company's pattern of success. David L. Francis, president, Princess Elkhorn Coal Co., Huntington, was toastmaster at the dinner and the speaker was Homer A. Holt, former Governor of West Virginia.

THE MARKETING PICTURE

"Markets Ahead and What the Coal Producers Must Do," by J. E. Tobey, president, Appalachian Coals, Inc., Cincinnati, read by Carroll F. Hardy, chief engineer, developed the theme that "coal's competition is within the industry itself" and that "it is apparent that any corrective measures must be applied to our own marketing policies. . . The main reason consumers have not paid more for coal in 1953 is the simple fact that our industry has not asked more for its product."

Because modern combustion equipment is more flexible than older equipment, some utility buyers work on the theory that they should be able to operate their plants on rejects and substandard coals. This trend appears at a time when operators have been mechanizing mines and installing preparation plants to produce refined and uniform products.

Informed buyers, however, instead of purchasing on a straight cents-per-million-Btu basis, are purchasing on specifications that evaluate the nuisance properties affecting over-all operation and maintenance, Mr. Tobey pointed out.

Appalachian Coals, Inc., a central marketing plan to obtain higher realization and profit by selling coals on the basis of their intrinsic over-all value, has been in operation 20 yr and has sold over 500 million tons of coal. Activities include engineering, traffic, advertising, publication of bulletins and consultation on marketing and utilization.

In summarizing, Mr. Tobey said: "Our present situation in the industry is due, mainly, to over-production which, in turn, is caused by a reduction of about 30% in the demand for coal from the peak postwar year of 1947. There are two ways within our own means to help the situation and they form a sharp doubleedged tool. If, under the direction of management, our operating departments can build a little resistance to their own impulses to run, and if sales departments can build a little resistance to the lowering of prices, these efforts would, in effect, be compounded and exert a very strong influence on the market."

COAL HYDROGENATION

Dr. George T. Felbeck, vice president, Carbide & Carbon Chemicals Corp., speaking on the subject, "Hydrogenation of Coal Provides a New Market," said that in his company's business natural gas is very definitely a competitor of coal. It was to supplant this raw material with coal at some future period of scarcity that it began coal hydrogenation re-

Newly Elected Officers

West Virginia Coal Mining Institute

President—H. A. Quenon, Beckley, W. Va. Vice Presidents—R. G. Luther, C. E. Hough Charles R. Nailler, George McCaa and R. G. La zelle.

Executive Board—Jesse Redyard, George R. Higinbotham, C. R. Bourland, James F. Trotter and Arch J. Alexander.

Sec.-Trees.-G. R. Spindler, Morgantown.

Central Appalachian Section, AIME

Chairman—George R. Higinbothem, Fairmont Vice Chairmen—C. H. Hodson, R. H. Hughes and Rhesa M. Allen.

Executive Committee—H. O. Zimmerman, E. K. Prosser, E. H. Greenwald and W. J. Skewes. Sec.-Treas.—C. T. Holland, Blacksburg, Va.



MARKETS, COAL HYDROGENATION AND CONTINUOUS MINING— Carroll F. Hardy (left), Dr. Charles E. Lawall, Dr. George T. Felbeck and J. E. Parker.

search, which has since veered off into the making of aromatic compounds directly from coal. There is a great market for these compounds because they will be used to make food, shelter and clothing, products that represent an unlimited market, Dr. Felbeck believes. He foresees a good possibility in 20 yr of building up those markets to the point where they will use 20,000,000 tons of coal per year. Large-scale production of the compounds may point to ways of reducing cost of synthetic gasoline to compete with petroleum.

"We would not survive if we did not spend a lot of money on research," said Dr. Felbeck. The chemical industry spends in the range of 1% to 5% of gross sales for research. On the same scale, the coal industry would spend \$20 million to \$100 million a year on research. The primary objective of coal's research may not prove to be of the greatest value, for it often happens that the research brings out some new angle.

Development of a coal-fired gas turbine to produce electrical energy can prove a great advantage to the coal industry, Dr. Felbeck emphasized. Such generating units could be mass-produced for as low as \$20 per kilowatt, thus holding total station investment to \$50 per kilowatt as compared to \$150 per kilowatt for the large steam stations, he believes. Not needing water, the coal-fired gas-turbine generating plant could be placed at any mine and the power fed into the network.

CARBIDE MINER PROGRESS

A sound-color film was presented showing the No. 3 Carbide Miner (Coal Age, December 1952, p. 73) in operation. For 652 operating shifts with nine men per shift, average production has been 73 tons per man-shift placed in the bin. The No. 3 Miner has been moved to a mine near Wellston, Ohio, where in the best two shifts it has mined 652 tons, and in the best one shift, 510 tons, producing an even

100 tons per hour of actual operating

The No. 4 machine, which had just started operation and had mined three holes at the time of the meeting, has 200 hp on the cutter-head and has chain-flight conveyors 6½ ft wide which will bring out ordinary falls of top material between arches, Dr. Felbeck reported.

With the experimental trials limited to operation at 200 tph and obtaining 20% operation, production is 34 tons per man-shift. If 40% operation can be obtained, production will be 4,000 tpd, with an efficiency of 90 tons per manshift, including trucking and piling the coal at the mine.

STORING GAS UNDER COAL

W. B. Jamison, vice president, Jamison Coal & Coke Co., Greensburg, Pa., in a comprehensive paper, "Danger from Storing Gas in Strata Below Coal Measures," pointed out that an American Gas Association report of Dec. 3, 1952, showed 151 active pools in 16 states, 4,940 active storage wells and 17 pools under construction. Corresponding data for West Virginia are 24 pools, 388 wells and 6 pools under construction; and for Pennsylvania, 50 pools, 1,281 active wells and 3 pools under construction.

Mr. Jamison's paper described a number of ways in which gas might escape from the original gas-tight production pool area. Uncharted wells are a great hazard in northern West Virginia, and "even known wells which are abandoned and plugged constitute a hazard to coal mines." The need for a co-operative approach by the coal and gas industries was stressed by Mr. Jamison, who recognizes that gas storage performs a beneficial and necessary service to the public. The gas industry was warned against mistaking the coal industry's motive as more concerned with financial than safety considerations and that the gas industry will meet a flood of drastic legislation if a disaster occurs,

E. C. Stump, vice president, United

Fuel Gas Co., Charleston, presenting a paper on gas storage in coal areas, called to the coal industry's attention the effect of gas storage in preventing dumping of gas at distress prices and displacing other fuels now used under boilers. He described storage pools and the specifications and tests that are made before his company establishes a pool. In discussing the proper plugging of wells, he pointed out that Columbia (the parent company) owns 300,000 acres of mineral lands in Lincoln, Logan, Wayne and Mingo counties, West Virginia, with over a billion tons of minable coal, "We certainly desire to protect that reserve," he said.

M. H. Forester, vice president, Pittsburgh Consolidation Coal Co., in discussing the gas-storage papers, cited many instances to prove that storage under or close to mining areas can be dangerous by introducing a human hazard over which there is no control. The two industries should strive for a solution without getting into public legislation, Mr. Forester said but he observed that during the past 11/2 yrs the two industries seem to be getting farther apart. At least five other men in attendance entered a back-and-forth discussion lasting over an hour, but no one came up with a solution to the problem.

COAL BY RAIL-RIVER-RAIL

"Rail-River-Rail Transportation of Coal Today and Days Ahead," presented by Morris Creditor, president, Ohio River Co., affiliated with the West Virginia Coal & Coke Corp., gave a clear picture of the growth and what it has meant to coal. On the Ohio River, total tonnage of all commodities increased from 23.2 million in 1937 to 56.5 million in 1951. In the years 1948 through 1952, coal tonnage was handled on the Ohio held very closely to one-half the total. In 1951, coal tonnage was 28 million, Mr. Creditor's paper included a brief history of inland waterways transportation in this country. He pointed out that for 50 yr the C. & O. Ry. has been hauling coal from



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the Logan field to Huntington for transshipment by water to Cincinnati, some of it serving rail markets in Ohio and Indiana.

Power plants on the Ohio River had a total capacity of 100,000 kw in 1917 and a capacity of 4 million in 1951. The totals are expected to reach 8 million in 1955 and 12 million in 1958. One new plant, at New Richmond, Ohio, does not even have a rail connection.

CONTINUOUS-MINER HAULAGE

Transportation back of continuous miners is most likely to be a development of the shuttle belt recently exhibited by Robins or, as a next best guess, a form of shaker conveyor, said E. C. Mc-Whorter, mining engineer, Goodman Mfg. Co., in a talk on "Dreams of Transportation Behind Continuous Miners." His company has already spent \$125,000 in research on the subject and now is practically marking time until the capacity of continuous miners is more firmly fixed.

When the Goodman research began, continuous miners were producing 1 to 2 tpm. Soon some of 3½-ton capacity (Colmol) appeared, and then 5 tpm (Marietta). Goodman first built articulated 8-ft-section chain conveyors which would bend around 90-deg turns. Factory tests indicated they could be successful up to 1½ to 2 tpm. Next came work on the McCarty shuttle chain conveyor, which has been demonstrated to do a good job up to 2 tpm. There appeared to be no hope of redesigning that type to handle 5 tpm so that idea was discontinued, Mr. McWhorter said.

In Mr. McWhorter's view, a chain conveyor cannot carry 5 tpm, so that the choice must be a belt, which would have to be at least 36 in wide. Since the Robins shuttle belt mounted on rubber tires and served with a bridge conveyor from the continuous miner has shown great promise in a potash mine, Goodman now is developing that idea toward refinement and high capacity, he reported.

Shuttle-belt conveyors will need a new mining system, that is, deep rooms so that equipment can move straight ahead for perhaps 5,000 ft, Mr. McWhorter pointed out. Moreover, it will be necessary to develop a means to carry the coal from the miner to the belt. Short belt conveyors, perhaps 15 ft long, is the present thought.

Shaker pans can be built to handle 4½ tpm but this length must be held to 400 ft. The drive would be right at the face and the pans would be mounted on rubber tires, Mr. McWhorter said.

Association Activities

Williamson Field Association And Upper Buchanan Meet

Officers were elected at the annual meeting of the Operators' Association of Williamson Field and the Upper Buchanan Smokeless Coal Operators' Association, held in Williamson. W. Va., Oct. 30. Williamson officers named were:

C. W. French, president, Peter White-Coal Co., Bluefield, W. Va., president; William M. Ritter, president, Red Jacket Coal Corp., Red Jacket, W. Va., vice president; J. D. McLaughlin, president, New Alma Coal Co., Huntington, W. Va., treasurer; and Joseph J. Ardigo, Williamson, W. Va., secretary. Officers of the Upper Buchanan group named were: C. A. Hamill, president, Sycamore Coal Co., president; J. W. Strickler, president, Page Pocahontas Corp., vice president; and Joseph J. Ardigo, secretary-treasurer. Mr. Ritter was named as a new director of the group. Directors of the Williamson Association are: E. M. Bane, DJB Collieries, Inc.; R. C. Denny, Emperor Coal Co.; C. A. Hamill, Sycamore Coal Co.; R. D. Jones, Kentland Elkhorn Coal Co.; Thomas H. Pritchard, Margaret Ann Coal Co.; Frank P. Smith, Lando Coal Corp.; L. E. Tierney Jr., Eastern Coal Corp.; and W. W. Walker, Majestic Collieries Co.

Northern W. Va. Group Meets

The Northern West Virginia Coal Association, at its annual membership meeting, Nov. 3, held in Fairmont, W. Va., elected the following officers: G. R. Higinbotham, president; J. F. Trotter, A. R. Reppert and Joseph McQuade, vice presidents; and Truman E. Johnson, secretary-treasurer. Directors elected, in addition to the officers, were George McCaa, Frank R. Amos, J. B. Stoetzer, C. R. Nailler, J. S. Farland, G. D. Curtin, F. E. Williams Sr., H. R. Woolridge, L. C. Campbell, W. B. Jamison, R. J. Craig, W. J. B. Mayo, R. W. Hanna, A. B. Ord, George Judy, Stephen Canonico and Clinton Cornelius.

Kanawha Operators Meet

At the annual meeting of the Kanawha Coal Operators' Association, Oct. 15, at the Kanawha Country Club, Charleston, W. Va., L. Newton Thomas, president, Carbon Fuel Co., was re-elected president of the association. Other officers named were: J. S. Conley, Wyatt Coal Co., vice president; and Harry G. Kennedy, re-elected executive secretary. Named to replace three members of the board of directors who have resigned were: Herbert E. Jones Jr., vice president, Amherst Fuel Co.; Roy S. Long, president, Riverton Coal Co.; and Whitney Warner Jr., president, Warner Collieries Co.

New River Group Disbands

Formal action was taken Oct. 25 by the group's membership to dissolve the New River Coal Operators' Association on Dec. 31, 1953, after 37 yr of service to the coal industry, "by reason of the continued decline of tonnage available to association membership with the view to effecting the liquidation while sufficient funds were available to discharge pension obligations," it was reported. Organized in 1917 by a group of coal mine officials headed by Charles Beury, Harry Caperton, William Holland and R. H. Morris, the association's purposes were the promotion of sales of coal, handling of general traffic work, and settling of its own labor problems.

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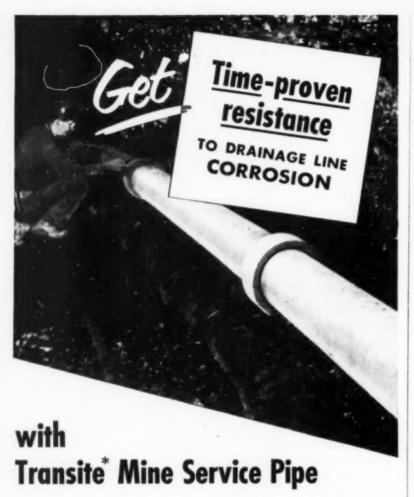




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Coal Company Reports

The Hudson Coal Co. and subsidiaries –9 mo to Sept. 30, 1953, deficit of \$2,220,725 on gross income of \$21,505,-251, compared with deficit of \$1,027,663 on a gross of \$28,239,198 for the same period of 1952.

Pittsburgh Consolidation Coal Co.—3 mo ending Sept. 30, 1953, net profit of \$3,126,551, equal to \$1.45 a common share, compared with a net of \$2,780,128, or \$1.29 a share, in the same quarter of 1952. For the 9 mo of 1953, earnings per share totaled \$4.23, against \$4.16 for the first 9 mo of 1952.

Truax-Traer Coal Co.-6 mo to Oct. 31, 1953, net income of \$1,104,379, or 84c per share, compared with net of \$816,729, or 57c a share in the same period of 1952.

United Electric Coal Cos.—3 mo to Sept. 30, 1953, net profit of \$365,729, equal to 54c a share, compared to a net of \$346,282, or 51c a share, in the 1952 quarter.

CHS Issues New Aid In Selling Coal to Schools

Coal Heating Service Div., National Coal Association, recently has released a new booklet titled "Coal Heat Saves Tax Dollars in Public Schools" as one more move in a stepped-up program to sell coal heat to small commercial, public and industrial plants.

The booklet, based on a dollars-andcents case-history survey of 13 representative schools in six Ohio cities, shows how coal heat and modern coal-handling equipment are saving taxpayers thousands of dollars a year. It has been brought to the attention of shipper executives, Ohio school superintendents and a list of 200 Ohio architects and consulting engineers. J. Nelson Stuart, CHS Div. manager, reports that "more enthusiasm has been expressed for the booklet than any other single item we have ever produced."

Copies of the booklet are available upon request to CHS headquarters, Southern Building, Washington 5, D. C. There is no charge for nominal quantities. Substantial quantities may be purchased at 10c per copy.

NCA Education Group Meets At Minnesota University

Details of the 5-yr plan now in effect in all engineering departments of the university and surveys of courses offered in mining engineering high-lighted the 2-day meeting of the National Coal Association's Vocational Training and Education Committee at the University of Minnesota, Minneapolis, Oct. 9-10. Besides top officials of the university and the head of the department of engineering, committee members were addressed by professors of geology, mining engineering, mechanical engineering, electrical engineering, civil engineering and mineral dressing. The committee also reviewed its own work and agreed to place more stress on the need for scholarships to attract young men to coal mining.

Industrial Anthracite Use Growing, P&R Man Says

Anthracite is not only holding its own in the industrial market, but is developing new uses in industrial applications, J. Goodyear, traffic manager of the Philadelphia & Reading Coal & Iron Co., said in an address Nov. 4 before the Stoker Club of Philadelphia.

Mr. Goodyear pointed out that steam sizes in 1952 accounted for 46.1% of anthracite's commercial production as compared with 36.2% in 1940. "Reports for the first 9 mo of 1953," he continued, "indicate that this shift is continuing.

The P & R official cited a number of industrial markets where anthracite is In the coke improving its position. industry, he said, an admixture of anthracite with bituminous coal is being used in increasing quantities in manufacture of coke. Its use, he explained, reduces coking time, increases productive capacity, produces an increase in the amount of coke resulting from a given weight of coal, permits an increase in the amount of coal charged, and results in larger and blockier coke, as well as harder and tougher coke well adapted to metallurgical purposes. "Anthracite," he noted, "is now being used in a number of commercial by-product coke-oven plants which ship to both blast furnace and foundry consumer. It is also being used," he went on, "in coke plants which are direct adjuncts of blast furnace and steel plants. We have

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reason to believe that the list of such users will grow.

Mr. Goodyear added that anthracite also is assuming more importance in the reduction of zinc ore, in the treatment of phosphate rock and in the lining of the pots in which aluminum oxide is reduced to metallic aluminum. "With the vast increase in aluminum production," he said, "this market has correspondingly developed."

The use of anthracite in the processing of low-grade iron ore was described by the speaker as "new and promising. In this application, the iron ore is pulverized and then agglomerated into pellets or burned into sinter in the presence of carbon, contained in anthracite up to about 90%.

Mr. Goodyear revealed that the industry also is looking toward another group of new uses. These, he said, still lie in the realm of research. They are based on the chemical use of the important gases into which anthracite can be converted, such as for the manufacture of ammonia, methanol, several alcohols and possibly plastics.

These chemical uses, he pointed out, are now in the course of substantial re-"When we find what can be search. done in manufacturing these products of which we are very hopeful," he said, "there will still be facing us the problem of economical production. Past experience in the chemical industry indicates that these problems will be solved," he

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MIDWEST FUELS—K. B. Nagler (left), Peoples Gas, Light & Coke Co., Chicago; W. S. Major, Dravo Corp., Pittsburgh, Pa.; and Earle Miller, Riley Stoker Corp., Worcester, Mass.



PREPARATION, COAL IN USSR-R. E. Sloan (left), Roberts & Schaefer Co., Chicago; R. B. Engdahl, Battelle Memorial Institute, Columbus, Ohio; and J. D. A. Morrow, Joy Mfg. Co., Pittsburgh.

Improved coal, better utilization, economics major topics at . . .

AIME-ASME Joint Fuels Conference

Over 300 conferees discuss germanium in flyash; preparation, drying and production problems; the mid-western coal and gas picture, and greater extraction of heat from coal's combustion gases

RECOVERY OF GERMANIUM from power-plant flyash is not economically feasible right now; heating process water in preparation plants improves dewatering, and Russia is rapidly building a productive coal industry. These were among the views presented by speakers at the 16th annual Joint Fuels Conference, sponsored by the Fuels Division, ASME, and the Coal Division, AIME, at Chicago, Oct. 29-30.

Other features of the 2-day program included the presentation of the Percy Nicholls award for 1953 to Henry F Hebley, research consultant, Pittsburgh Consolidation Coal Co., Pittsburgh, Pa., by Clayton G. Ball, vice president, Paul Weir Co., Chicago; luncheon talks by Tom Pickett, executive vice president, National Coal Association, Washington, D.C., on coal and world affairs, and Robert E. Wilson, chairman, Standard Oil Co. of Indiana, on research in fuels for internal-combustion engines. Featured speaker at the Thursday evening banquet was H. W. Johnson, vice president. Inland Steel Co., Chicago, on the history of the steel industry in Chicago.

At the opening session on Thursday morning, R. C. Corey, chief, Bituminous Coal Utilization and Preparation Branch, USBM, Pittsburgh, spoke on the occurrence and determination of germanium in coal ash from power plants, followed by C. E. Silverblatt, development engineer, Eimeo Corp., Chicago, on the economical reduction of the moisture content of washed coal. Co-authors with Mr. Corey were J. W. Myers and W. A. Selvig, Bituminous Coal Utilization and Preparation Branch, and L. B. Berger, chief, Health Branch, USBM, Pittsburgh. D. A. Dahlstrom, director of reserach and development, Eimeo Corp., collaborated with Mr. Silverblatt. Co-chairmen of the opening session were R. E. Zimmerman, chief preparation engineer, U.S. Steel Co., Pittsburgh, and T. S. Spicer, associate professor, School of Mineral Industries, Pennsylvania State College, State College, Pa.

GERMANIUM IN ASH

Coal should be burned to concentrate germanium, thus ruling out selective mining, and some effort should be made to evaluate the germanium content of the gaseous products of combustion, Mr. Corey declared, in reporting that studies appear to indicate germanium may condense on ash particles in the cooler zones of power-plant burners. Working in cooperation with U.S. Army Signal Corps engineers, Bureau of Mines scientists analyzed over 500 samples of ash from coal-fired, steam-generating boilers using Pennsylvania, Ohio, West Virginia and Illinois coals.

Generally, the germanium content of the flyash ranged from 15 to 90 ppm, Mr. Corey said, and the two richest samples contained 170 and 530 ppm. A limited study of particle size gave evidence that the finer particles of flyash usually are richer in germanium than the coarser sizes. Using spectroscopic methods of analysis, it was determined that cyclone-fired and chain-grate installations showed higher concentrations of germanium in the resulting ash than did other firing methods. Slag-bottom burner installations showed least.

In answer to a discussion-period question on the economical possibility of recovering this flyash germanium, it was brought out that a germanium concentration of 1,000 ppm now is approximately the lower limit, according to Eagle Picher studies.

REDUCING MOISTURE CONTENT

Experimental evidence turned up in studies of coal in the size range handled by filters proves that surface tensions down to about 32 dynes have relatively little effect on final moisture content, Mr. Silverblatt said, but, on the other hand, viscosity is highly significant in this size range. By lowering viscosity from 1.55 centipoises at 40 F to 0.861 centipoises at 80 F, by process-water heating, moisture content of the filter cake was decreased from 23.3 to 19.9%. Heating process water to 120 F, thus reducing viscosity to 0.560 centipoises, reduced moisture content of the cake to 18.1%.

Wetting agents were found to have a profound effect on cake moisture, Mr. Silverblatt added, in pointing out that surface-moisture contents were decreased 40% by including 0.1% by





COAL USE, DEWATERING—W. W. Coffin (left), Link-Belt Co., Chicago; E. R. Kaiser, BCR, Columbus, Ohio; H. A. Herder, Sahara Coal Co., Chicago; C. H. Sawyer, Eastern Gas & Fuel Associates, Pittsburgh; and C. E. Silverblatt, Eimco Corp., Chicago. PERCY NICHOLLS AWARD—Henry F. Hebley (right), research consultant, Pittsburgh Consolidation Coal Co., received recognition for outstanding achievement in solid-fuels studies.

weight of Aerosol OT in the filter feed water.

From these observations and other experimental results it was proposed to heat circulating water to 80 F, a reasonable temperature level at which cost comparisons could be made, Mr. Silverblatt explained. Calculations were based upon operating data obtained from the Ceredo, W. Va., plant of Truax-Traer Coal Co. The comparisons showed that costs in closed-heated-water circuits are competitive with thermal drying in many instances. Furthermore, initial costs for the proposed system are lower, a measure of freezeproofing is provided and some of the cost of stream-pollution prevention is absorbed since closing the circuit becomes a part of the dewatering installation.

The proposed process would be greatly assisted, Mr. Silverblatt emphasizd, if optimum desliming and countercurrent flow of coal and circulating water are practiced. Drainage rates should be greatly increased and lower ash should result.

The moisture-reduction theme continued into the Thursday afternoon session with a lead-off paper by W. W. Coffin, manager, Dryer Div., Link-Belt Co., Chicago, Ill., on the pelletization of feed to Multi-Louvre driers. Final paper at Thursday's technical sessions was entitled "Frontiers in Heat Extraction From the Combustion Gases of Coal," by E. R. Kaiser, assistant director of research, Bituminous Coal Research, Inc., Columbus, Ohio. C. H. Sawyer, and H. A. Herder, combustion engineers, Eastern Gas & Fuel Associates, Pittsburgh, and Sahara Coal Co., Chicago, respectively, were co-chairmen.

PELLETIZED FINES DRIED

From data obtained in a series of tests it was concluded that fine coal can be pelletized and dried in a Multi-Louvre drier, that it can be handled on a standard conveying system very satisfactorily, that high-efficiency dry dust collectors are satisfactory for this service because of the agglomeration of the

INDUSTRY MEETING— A Special COAL AGE Staff-Written Report

fines, and that the drier product can be stored in bins or stockpiled and later returned to the system without any trouble, Mr. Coffin said.

The coal used in the tests contained a high proportion of minus 325-mesh fines and 20.5% moisture, 8% inherent. Pelletization was accomplished by mixing this feed with recycled coal from the drier in a paddle mixer to produce 35 tph of 15%-moisture feed for the drier. The drying goal was 9% total moisture.

In reviewing the test conditions and results, Mr. Coffin pointed out that the pellets produced in the paddle mixer resisted degradation in the drier and in the laboratory conveying system, losses through the dust collectors were at a minimum, and even in stockpiles of dried coal subjected to a much as 1½ in of rainfall, the pellets resisted degradation in the main body of the pile although the outer ½ in broke up.

BETTER COAL USE

Technical and economic limitations on cleaning coal by known processes makes it mandatory that combustion-equipment designers provide for handling ash and sulfur at the point of coal use, Mr. Kaiser explained, in noting that this balance between cleaning the coal and tailoring the burner results in most favorable over-all costs to the consumer.

After reviewing the problems encountered in using coals of different ashsoftening characteristics and the insulating effects of ash or slag deposits on boiler tubes, Mr. Kaiser listed conclusions as follows:

 Modern power boilers and combustion devices are highly advanced in regard to thermal efficiency and ability to cope with ash in coal. However, further research on ash behavior and slag prevention would be desirable to find methods for keeping boiler tubes clean.

The role of non-sulfate ash dust in condensing the alkali sulfates and rendering them non-adherent to tubes needs investigation with a view toward wider practical application.

3. Cooling of flue gases to 150 F is worthy in preventing corrosion and deposists in air preheaters. Each 35- to 45-deg reduction in flue-gas temperature increases boiler efficiency 1%.

4. Several possibilities exist for the control of troublesome sulfates in flue gases. The prevention of SO₃ might be prevented by techniques yet to be developed, but the likelihood is slight; normal amount of SO₃ in flue gas might be absorbed on basic dusts ahead of or in the air preheater, or SO₃ might be condensed out with water vapor by cooling the gases in acid-proof preheaters.

5. SO₃ now assists in reducing air pollution from power plants by reducing the electrical resistivity of flyash in electrical precipitators. In future air preheaters of acid-proof construction, the sulfuric acid produced may be useful in trapping flue dust, and it could be recirculated if necessary to wash dust from surfaces.

6. Solutions to the ash and sulfur problems in the use of coal appear to lie in improved combustion and utilization rather than in further cleaning by the producer.

Solid-fuels outlook and natural-gas supply for the Midwest were major topics of the Friday-morning session, presented respectively by W. H. Vos-kuil, mineral economist, Illinois State Geological Survey, Urbana, Ill., and K. B. Nagler, vice president—operations, Peoples Gas, Light & Coke Co., Chicago. Co-chairmen were W. S. Major, project engineer, Dravo Corp., Pittsburgh, Pa., and Earle Miller, Riley Stoker Corp., Worcester, Mass.

SOLID FUELS OUTLOOK

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Iowa and Missouri, obtains its coal supply from 16 states in the Appalachian fields across the plains to the mountain states, Mr. Voskuil outlined, in pointing out that the total quantity of coal shipped into the area approaches 100 million tons per year. About one-sixth of the coal received is used in making coke and is not competitive with coal mined in Illinois, Indiana and western Kentucky. The major groups of coal users are retail outlets, utilities, manufacturing industries, by-product coke producers and railroads, in order of importance, with railroad markets disappearing rapidly, consumption by utilities rising and retail outlets finding more and more competition from gas.

On the price situation, Mr. Voskuil reported as follows:

Previous to 1941, freight cost was a more important factor than the average cost of coal at the mine. Since then, items that have regulated the mine cost have risen faster than freight rates have increased. Between 1935 and 1950, average freight costs have risen from 9.0c to 12.4c per million Btu, while average mine prices have risen from 7.1c to 19.4c per million Btu.

The average per-ton increase in freight cost as reported by the ICC probably reflects the increases in rates granted from time to time but does not reflect changes in the pattern of coal distribution, such as longer freight hauls, Mr.

Voskuil added.

Of some interest in the Midwest fuel-consumption picture, Mr. Vosquil pointed out, is the shift of natural gas consumption from the interruptible industrial load to firm markets. The transfer of natural gas use from the industrial market to the domestic-heating market in the Chicago district should ultimately bring about an increase in demand for western interior coal production for industrial iron and a reduction of Appalachian coal now entering the domesticheating market.

In discussion, H. C. Woods, chairman of the board, Sahara Coal Co., Chicago, noted that some steel companies are finding that they can include Illinois coals in their coke blends to reduce the cost of the coke, and for this reason the role of Illinois coal in the steel industry should grow. Railroad rates need adjustment, however, to insure that other classes of railroad service bear their proportionate share of railroad operating costs, Mr. Woods added.

NATURAL GAS SUPPLY

After reviewing the history of the natural-gas industry in the Chicago area, Mr. Nagler pointed out that since 1952 the area has operated on a 900-Btu per cubic foot standard of mixed natural gas and manufactured gas.

On the problems of the gas industry, Mr. Nagler pointed out that since househeating is the large-volume load for which natural-gas pipe lines are built, and since this load in the Chicago latitude has only a 25% load factor, an early and continuing problem has been that of building up pipe-line load factor. One obvious approach was to create a new load for deep summer "valleys" by the establishment of interruptible, offpeak business. This load includes fringe heating and water heating for hotels, large buildings, laundries and so on, and the connected load now is about 130 million cu ft per day.

Another problem is gas storage at the consumer end of pipe lines. On this, Mr. Nagler reported that a 1952 national survey showed 124 storage fields in use storing 587 billion cu ft, with 13 fields under construction and three more proposed for a total storage capacity of 909 billion cu ft. The largest are in Texas and Pennsylvania, with usable capacity of 65 and 60 billion cu ft, respectively.

Exhausted gas or oil fields are not plentiful where they are needed, however, so other storage methods have been developed. At 2.240-lb pressure, natural gas has its greatest deviation from Boyle's Law, making it possible to store in alloy-steel containers 40% more gas than the ratios of absolute pressures would indicate. Underground chambers in suitable rock strata may be used to store gas at 1,000 lb or for the storage of liquefied petroleum gas.

Despite the enormous expansion of the natural-gas industry, Mr. Nagler said, the proved, recoverable natural-gas reserves in the United States have been increasing more rapidly than the consumption. But after natural gas—what? Of the presently known sources of primary energy, only coal appears to be so plentiful as to be a future source of gas. A complete gasification process with upgrading by synthesis seems indicated. The gas industry already is studying the problem of replacement when natural gas reserves begin to decrease significantly.

Julian Tobey, president, Appalachian Coals, Inc., Cincinnati, in discussion, declared that it is gratifying to note that the gas industry is taking steps to stabilize its year-round markets.

At the closing session on Friday afternoon, speakers and their subjects were:
J. D. A. Morrow, president, Joy Mfg.
Co., Pittsburgh, Pa., "Coal-Mining Developments in the USSR," and Robert E. Sloan, executive vice president, and W. C. McCulloch, preparation engineer, Roberts & Schaefer Co., Chicago, "Coal-Preparation Developments." Co-chairmen were R. B. Engdahl, supervisor, Battelle Memorial Institute, Columbus, Ohio, and R. I. Bush, combustion engineer, Eastern Gas & Fuel Associates, Pittsburgh.

COAL IN THE USSR

"On coal's horizon one development rises above all others," Mr. Morrow declared. "That is the swift expansion of output to make Soviet Russia the largest coal producer on earth next to the United States." Few Americans are aware of the speed and extent of that expansion nor of the accompanying creation of a strong, resourceful mining-machinery industry.

Getting down to figures, Mr. Morrow pointed out that in the 25 yr since the inception of the first Five-Year plan (1928), American and British coal out-

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put was stationary or had declined slightly, while the Soviet output in 1952, some 332,000,000 tons, was nearly eight trees the 1928 total. And for 1955 the Soviet rulers plan to push output up to 416,000,000 tons. Crude steel production shows similar growth—19.4 million tons in 1937, 38 million tons in 1952 and 48.7 million tons planned for 1955. German steel production at the start of World War II was 25 million tons in 1939, Mr. Morrow reminded his listeners.

The rate of increase in production of electric power follows the same pattern of growth, Mr. Morrow said, in pointing out that the industrial expansion which might be expected from the development of the Russian coal industry is confirmed by the steel and power figures.

The evidence indicates that Soviet recovery from the devastation of war has been far swifter than that of West-ern Europe, with the Kremlin offsetting our Marshall Plan aid to Western Europe by drafting manpower, male and female, and working people long and hard to obtain overwhelming economic power, Mr. Morrow said, and they understood that the cornerstone of such power is a modern, efficient coal industry.

In the lively discussion following Mr. Morrow's paper, L. E. Young, consulting engineer, Pittsburgh, brought out the fact that American coal-industry leaders are making progress, too, with perhaps 300 continuous-mining machines of all types to be in service by the end of this year.

Paul Weir, president, Paul Weir Co., Chicago, cautioned against making unfair comparisons of Western European productivity with ours since overseas mining conditions present many more problems. We can't discount what they are doing or what they aim to do, Mr. Weir said.

Other discussion speakers, including L. C. Campbell, vice president, Eastern Gas & Fuel Associates, Pittsburgh; C. C. Conway, chief electrical engineer, Peabody Coal Co., Taylorville, Ill. and Gordon McVean, president, National Mine Service Co., Pittsburgh, saw the figures on Russian coal-industry expansion as a challenge to alert us to progress elsewhere and to spur us to stimulate our own pace in developing and adopting new methods and equipment for the economic war with which we may be faced.

PREPARATION DEVELOPMENTS

Specifically mentioning the Crown, Leatherwood, Itmann and Georgetown cleaning plants as prime examples of modern coal-preparation activities and describing flow circuits in these plants, Mr. Sloan pointed out that savings and increased efficiency that come from well-prepared, high-Btu bituminous coal are enabling many industrial and utility coal consumers to successfully combat high fuel costs resulting from high freight rates and expensive handling. Recently large modern plants have been built to upgrade the impure, high-moisture coal of the middle west, the AEC has



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Branch Offices: New York, Philadelphia, Pittsburgh, Grand Junction, Colo., Buchans, Newfoundland placed a premium on prepared coal as contrasted to the raw run-of-mine for which they originally contracted and new plants in central Pennsylvania have been built to produce by-product coal from the low-volatile seams which formerly were marketed only as steam coal.

A great deal of study is being pursued to perfect methods of cleaning dependent upon different surface characteristics of the coal and its impurities such as froth flotation, convertol and electrostatic separation, Mr. Sloan added, after reviewing present processes, including straight water cleaning and heavy-media and pneumatic separation.

Sometimes there is difficulty in deciding to what point coal for a specific use should be washed. In quoting J. D. Price, superintendent-coke plant, Colorado Fuel & Iron Corp., on this matter, Mr. Sloan pointed out that washing to too low an ash with resulting decreased recovery can be just as costly as no washing at all. Highest economic value may be obtained by operating at some intermediate point, and the same correlation of facts may be set up for steam coal as for coking coal. Factors controlling this dividing point are mining costs, freight costs, coal- and ash-handling costs and the load rating in the boiler plant, for example.

In the discussion, J. B. Morrow, consultant, Pittsburgh, declared that producers can't expect to get paid for preparation that does not benefit the customer, and noted that there may be a trend toward not cleaning fine coal. George Land, combustion engineer, Peabody Coal Co., Chicago, brought out that it is necessary for coal producers to set cleaning goals before laying out their plants to get the most out of their investment.

Safety Day Competitions

At the Annual Safety Day of the Big Sandy-Elkhorn Coal Mining Institute, held in Pikeville, Ky., Sept. 26, teams from Consolidation Coal Co. (Ky.) took first place in both divisions of the first-aid contest. The Hendrix mine team, captained by E. Cox, placed first in the white division and the Mine 204 team, captained by C. Cummings, headed the colored division. In the boys' and girls' divisions, winners were teams from the Princess Elkhorn Coal Co., captained by R. Music and J. McKenney, respectively. In the mine-rescue contest held the previous day, teams from Consol's Mine 204, captained by R. Wetzel, and from Inland Steel Co., captained by V. Blevins, tied for the top honors.

Winner of the first-aid contest of the Cumberland Valley Mining Institute, Middlesboro, Ky., Sept. 26, was a team of the Big Jim Coal Co., Blanche, Ky., captained by H. Leonard. Runner-up teams, and their captains, were: Clearfork Coal Co., Fonde, E. Brassfield; Black Star Coal Corp., Alva, H. Mayfield; Black Star Coal Corp., Alva, P. Helton; and Margo Coal Mining Co., Pineville, S. Large.

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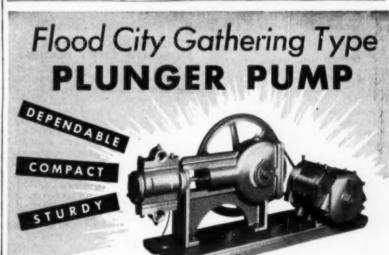
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Reviews of successful training programs, roof coating and bolting, accident prevention in beltand track-haulage mines and short-delay blasting trials in bituminous coal feature Coal-Mining Section meetings.



SPEAKERS AND OFFICERS—J. V. Berry (left), Bethlehem Mines Corp., and retiring section chairman; J. M. Reid, The Hudson Coal Co., chairman elect; John Ghizzoni, UMWA; William Rachunis, USBM; J. J. Plasky, Red Jacket Coal Corp.; and H. A. Schrecengost, USBM.

How to increase safety by better training and methods themes of . . .

41st National Safety Congress

HOW GOOD TRAINING PROGRAMS can be organized and how they pay off in improved safety and smoother operation, how the application of new methods of roof control increase both safety and recovery and how short-delay blasting in underground bituminous coal mines holds promise of further improving safety and efficiency were among topics presented and discussed at the 3-day meetings of the Coal-Mining Section of the National Safety Council at Chicago, Ill., Oct. 19-21. Over 100 representatives of operating companies and safety-equipment manufacturers also heard discussions on the effects of off-track mining and transportation on haulage accidents, prevention of belt-conveyor fires, and prospects for improving mineworker participation in safety training.

The conferees also elected section officers for the coming year as follows: Chairman—J. M. Reid, general manager, The Hudson Coal Co., Scranton, Pa.; First Vice Chairman—William Schuster, safety manager, Hanna Coal Co., Div. Pittsburgh Consolidation Coal Co., St. Clairsville, Ohio; Second Vice Chairman—F. J. Foresman, director of industrial relations, Pittsburgh & Midway Coal Mining Co., Kansas City, Mo.; and Secretary—H. F. Weaver, chief, Coal-Mine Inspection Branch, USBM, Washington, D. C. G. G. Grieve continues as the National Safety Council's representative to the coal-mining section.

General theme of the opening session on Monday was training and its benefits, with speakers as follows: H. A. Schrecengost, supervising inspector, USBM, Schuylkill Haven, Pa.; J. J. Plasky, training and safety director, Red Jacket Coal Corp., Red Jacket, W. Va.; John Ghizzoni, president, District 2, UMWA, Ebensburg, Pa.; and William Rachunis, minesafety representative, USBM, Beckley, W. Va. J. V. Berry, Bethlehem Mines Corp., and retiring section chairman, presided at all sessions, assisted by Mr. Reid, chairman-elect.

ANTHRACITE SAFETY TRAINING

Among the many important problems harassing the coal industry in general and anthracite in particular is that of training men in known safe and efficient work habits, Mr. Schrecengost said, but an even greater training problem is that of counteracting traditions and customs which motivate unsafe work practices. Noting that until recently most safety courses were set up with bituminous operations in the spotlight, Mr. Schrecengost pointed out that it was the incorporation of certain safety provisions in the 1947 anthracite wage agreement which led to more active and potent participation of the UMWA in the industry's safety effort, the preparation of an accident-prevention course specifically designed for anthracite application, ensuing rapid extension of the program to the place where 46% of the regional working force has completed the training schedule, and the realization of worthwhile benefits.

Enthusiastic interest among the workmen, essential to the success of the program, was developed through press and radio publicity, talks by Bureau officials to local union assemblies, service

INDUSTRY MEETING — A Special COAL AGE Staff-Written Report clubs and church groups and through internal influences exerted within the union and among company officials. Best results were realized from the training when the organizational and instructional phases of the program had the active, sincere participation of both labor and management officials, Mr. Schrecengost declared.

On the overriding need for effective, integrated accident-prevention training, Mr. Schrecengost pointed out that the apprentice system, whereby "experienced" men are entrusted with the job of training new employees, may not be desirable since the accumulation of experience does not necessarily qualify one as a teacher. Furthermore, there is need for intensive training in the proper analysis of day-by-day tests and observations of physical surroundings by the worker himself. Much time and labor have been expended upon the compilation of historical statistics leading to conclusions that accident victims were careless or wilfully disobedient to instructions, Mr. Schrecengost said, with little thought as to whether or not the victim had the ability to comprehend the conditions he observed, the sounds he heard or the vibrations he felt.

"When we consider that 18,000 anthracite workmen have been killed on the job during the lifetime of most of us . . . and that the ratio of nonfatal to fatal injuries is about 80 to 1, does it not appear that safety education should be extended?" Mr. Schrecengost asked, in making the point that safety education, well organized and properly presented, should be extended to all mine workers. It is training for the future, Mr. Schrecengost concluded.

ACROSS-THE-BOARD TRAINING

Top management can be sold on the idea of comprehensive training within the coal industry in view of such training benefits as a reduction in accident frequency rate from 98.5 to 7.9 at one property and in view of the knowledge that 89% of mine accidents can be attributed to human failure, Mr. Plasky declared. Furthermore, success in the industry requires the realization of the goals of such comprehensive training: Increased knowledge, changed attitudes, new habits and new skills. Where material and human resources are available to all competitors, training becomes the controlling factor in the progress of the company, Mr. Plasky continued, in describing the programs of the Red Jacket Coal Corp.

Organizing a training program is not as difficult as it may seem, and all companies may institute such training. Necessary steps in the organization of training effort include a review of existing training programs, conferences with educators, selection of instructors and selecting and timing the instruction. The full text of Mr. Plasky's paper appears in the November issue of Coal Age, beginning on p 98.

PROMOTING CO-OPERATION

Speaking on the subject "Holmes Safety Association Work as a Means of Promoting Co-Operative Safety Programs," Mr. Ghizzoni compared safety education for mineworkers with combat training for front-line soldiers. Neither type of training alone wins the battle, but both are vital to the achievement of the final objective, saving lives in the mining instance.

Too many "corner-cutters" among the operators refuse to accept their basic responsibility to make their properties as safe as possible, and too many miners think of safety as something for the other fellow to follow, Mr. Ghizzoni stated, and these unrealistic attitudes on both sides are those which the Holmes Safety Association seeks to overcome. It is not a matter of who is right, but what are we going to do and continue to do to improve safety in the mines.

In expanding his point that safety education is not entirely effective in saving lives. Mr. Ghizzoni said that for years too many on the operating side have argued that education is the total answer, but coal miners know that isn't so. There must be a safety code backed up by a safety law with teeth in it. And without such a code, Mr. Ghizzoni continued, progressive operators would be at a competitive disadvantage with corner-cutters who will take chances.

Strict observance of the code, coupled with continuing education through agencies like the Holmes Safety Association will result in improved safety, and the union stands ready to continue its wholehearted co-operation in the work of the association, Mr. Ghizzoni concluded

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ing the nut. Smooth, torque-free force is applied by operating the pump unit, and the stress can be read directly in tons from a gauge on the pump. The test is completed in minutes! Re-Mo-Trols are available in 7 models -10 to 100 ton capacities.

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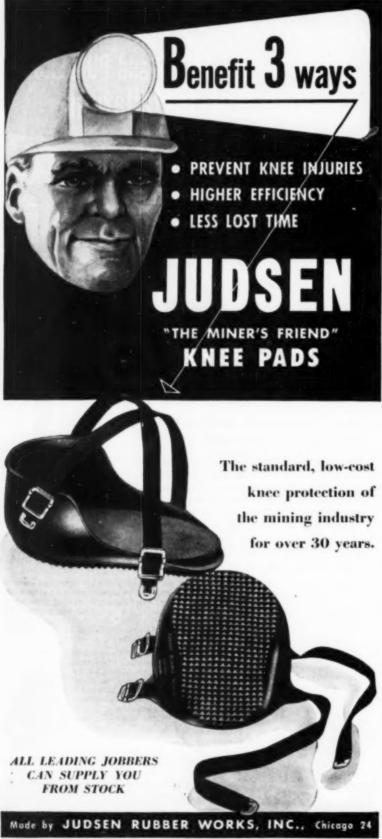
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has been achieved in southern West Virginia since the August, 1952, organization of the Beckley Holmes Safety Council and local chapters, Mr. Rachunis said, in the concluding Monday session. Covering 18 member mines in the area employing 5,629 officials and mineworkers, statistics show a frequency rate of 55.90 for the 8 mo prior to council and chapter organization and a frequency rate of 29.80 for the 8 mo following the organization meeting. The record for the prior 8 mo showed 32 lost-time accidents and 0.75 fatals per month at these mines, and for the following 8 mo, a drop to 13.75 lost-time injuries and 0.50 fatals, Mr. Rachunis reported. Several mines which previously never had an accident-free month have materially improved their safety records since the organization date.

In August, 1953, Mr. Rachunis said, a new council was formed at Keystone, W. Va., with 20 mines and 14 chapters affiliated. Total employment in these mines is 6,062 mineworkers and officials.

Speakers and their subjects at the Tuesday session were J. S. Whittaker, safety director, Pittsburgh Coal Co., Div. Pittsburgh Consolidation Coal Co., Library, Pa., on the effects of off-track mining and transportation on haulage accidents; C. A. Herbert, mining engineer, USBM, Vincennes, Ind., on roof coating to prevent detrimental effects in mine roof during the summer; and a panel discussion concerning what can be done by labor and management to bring about greater participation among mineworkers in safety-education pro-grams. Panel members were: J. B. Yanity, coal-mine inspector, USBM, Norton, Ky.; Mr. Schuster, vice chairman-elect; Joseph Bierer, chief, West Virginia Department of Mines, Charleston, W. Va.; J. H. Mosgrove, safety director, Big Sandy-Elkhorn Operators' Association, Pikeville, Ky.; and Charles R. Ferguson, safety director, UMWA, Washington, D. C. M. J. Ankeny, safety director, Bituminous Coal Operators' Association, Washington, was moderator.

OFF-TRACK HAULAGE SAFETY

Streamlining mechanical-loading crews, turning to shuttle cars for face transportation and being careful in the selection and training of shuttle-car operators are among the contributing factors leading to improved haulage safety at mines of the Pittsburgh Coal Co., Mr. Whittaker said, in discussing how haulage accidents have happened in the past and how their frequency of occurrence may be reduced. In comparing methods, Mr. Whittaker pointed out that in the first 8 mo of 1953, the company had mined approximately 3,200,000 tons with crawler-type machines loading into shuttle cars with 2 lost-time accidents charged to haulage. In the same period, 1,100,000 tons were mined with similar machines loading into mine cars and 10 lost-time haulage accidents occurred. A breakdown of the 10 accidents shows that five were attributed to derailments or to rerailing; one to runaway cars; two in coupling; one fatal accident to backpoling; and one to timber dislodgment

caused by overhanging slate on a mine car.

As a step toward improving safety, the operator's helper was removed from loading crews because he was exposed to hazards by the very nature of his job. The brakeman now helps the machine operator in handling cable and so on. In shuttle-car sections there is no helper.

Highest-possible safety under shuttlecar methods requires the maintenance of adequate clearance, always a problem because roof conditions limit working-place width to 14 ft in the Pittsburgh seam. However, roof bolting and stub timbering have materially relieved this problem, Mr. Whittaker said. Furthermore, new buggy operators are assigned to straight runs to permit them to become familiar with the controls, before they are assigned to regular production runs.

Haulage checks, a hazard to shuttlecar operators, are eliminated wherever possible. Self-centering doors, double rows of stoppings and effective line brattices are employed to provide adequate air at the face.

Wet bottom is a real problem, Mr. Whittaker concluded, but local sumps, mine projections which take advantage of natural drainage and road coverings of slag or planking are used to advantage in facing up to this problem.

SEALING MINE ROOF

Results of Bureau of Mines experiments, conducted by H. P. Greenwald, regional director, Region VIII, and Dr. Irving Hartmann, chief, dust explosion and mine experiment branch, indicate that alternate wetting and drying-out in the mine roof cause greater excesses of expansion and contraction than do changes in temperature, Mr. Herbert explained, in reviewing the early history of roof coating and the disadvantages of the early coating materials.

A suitable roof-coating compound, Mr. Herbert said, should have the following characteristics:

 It should not give off highly flammable or toxic vapors during application nor while drying-out.

The flammability should not exceed that of the coal surfaces.

The material should not be irritating to the skin.

4. Its adhesive qualities should be

good.
5. The material should set to a rub-

ber-like consistency.

6. It should be highly resistant to moisture penetration.

The viscosity should be high enough to give a sufficiently thick coating to seal off cracks and joints in one application.

8. The cost should be low.

The compound should be readily applied by a pressure-spray gun.

To date the material more nearly conforming to these specifications is a fibrated asphalt mixture containing a thinner of high flash point and approximately 8% asbestos fiber. Such a mixture now is in use in mines of the Hicks coal interests, Leechburg, Pa., and Bell & Zoller in Illinois, and is undergoing trials at Enoco Collieries, Bruceville,



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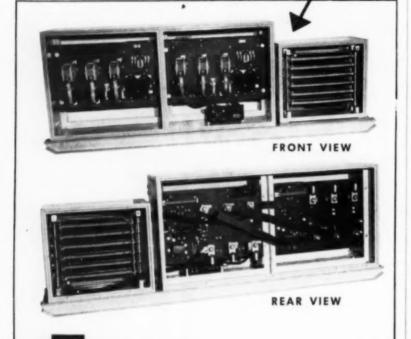
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Ind., and Green Valley mine, Snow Hill Coal Corp., Terre Haute, Ind., Mr. Herbert said.

Such coating materials also may be used to prevent air leakage stoppings, which in one amounted to about 70% of the air delivered by the fan.

GETTING 100% TRAINING

In the panel discussion on how to secure greater participation in safety training among mineworkers, it was the consensus that:

 It takes more than lip service from both management and labor officials, if the men are to be convinced of the value of the training.

2. The officials might well take the training themselves to find out what is involved and what the men will be learning.

3. The instructor must be well versed in mining, he must be properly prepared and he must be sincere both within him-

self and in his presentation.

4. The course material must be well planned, it must be localized for the benefit of the trainees and it must be interesting, if there is to be 100% completion at any given mine.

5. Sincere missionary work on the part of local and district union officials and mine officials will go far in getting men to attend the classes, absorb the training, and thus become safer em-

ployees

Speakers and their subjects at the Wednesday session were: A. D. Sisk, chief, Kentucky Department of Mines and Minerals, "Belt-Conveyor Fires and Their Prevention"; A. J. Barry, mining engineer, USBM, Denver, Colo., presenting a paper prepared by A. J. Gracie and Joel N. Van Sant, general manager and chief engineer, respectively, St. Louis, Rocky Mountain & Pacific Coal Co., Raton, N. M., entitled "Pillar-Recovery in Roof-Bolted Areas"; and Bernard Lewis, chief, explosives and physical sciences division, USBM, Pittsburgh, Pa.

PREVENTING BELT FIRES

In recounting the history of fighting an actual mine fire at Evanston, Ky., in which four men lost their lives, Mr. Sisk reported that it was the opinion of investigators that the fire had its origin in the friction created when a fall stopped the belt while the drive motor continued to operate. Facts turned up in the investigation indicate that the belt was permitted to run unattended on the third shift, while supply men in the mine took care of other necessary duties. Although the belt stopped, the overcurrent relay in the control circuits did not interrupt the current, indicating that the 40-hp drive motor was not overloaded even though the head pulley was turning under the stalled belt, Mr. Sisk explained.

Rescue efforts were hampered by smoke, necessitating an eventual reversal of the ventilating current. The outcome is that Kentucky now has a law requiring the isolation of all belt headings to a separate split of air. Other pre-

ventive measures advocated by Mr. Sisk include:

Rubber belts should not be permitted to operate unattended.

Centrifugal switches which will interrupt power circuits when a belt stalls should be installed.

 All workmen should be provided or equip themselves with self-rescuers.

 Sectionalizing circuit breakers with over-current relays should be installed in all butt-entry feeder circuits.

5. Fire extinguishers, rock dust and a water line with a minimum water pressure of 40 psi, together with necessary fittings, valves and fire hose, should be provided at each belt drive a suitable distance outby the drive to insure their immediate accessibility in case of fire.

All belts should be patrolled and kept free of coal-dust or other accumu-

lations and obstructions.

Proper control lines should be installed along the belt, making it possible to stop or start the belt from any location.

 Emergency plans should be drawn up and the workmen instructed in how to put the plan into effect in the event the need arises.

BOLTED-AREA PILLARING

Roof bolts in combination with conventional props and timbers have proven effective in permitting selective mining and pillar extraction at Koehler mine. Messrs. Gracie and Van Sant reported, in pointing out that the application of roof-bolting techniques has increased the value of coal reserves at Koehler by as much as 25%. Operations are in the Raton seam, where typical sections show 4 ft of bottom coal, from 6 to 18 in of bone and carbonaceous shale, and 4 ft of top coal. Under previous methods, from 2 to 3 ft of top coal was left in place, even though it was exceptionally low in ash, because of the treacherous nature of the roof. Now the three layers are mined as individual benches, and the additional room resulting from the change to roof bolts provides gob space for the boney material, the authors said.

In the rooms, 6-ft-long bolts on 5-ft centers are used with wood cushion plates. In addition, an indicator row of posts and cap pieces is set along the gob side, with the posts on 9-ft-centers. Pillar recovery is begun by driving an 18-ft-wide crosscut between the ends of adjacent completed rooms. In the crosscut, bolt spacing is increased to 7 ft both ways, with rib bolts 2½ ft from each rib. Succeeding pillar pockets are driven across, leaving a 6-ft fender between the robbed area and the new pocket. The fender is pierced at intervals to remove as much support as possible. Caving is induced by drilling holes on 5-ft centers into the roof on a line perpendicular to room centerlines, worked-out area is heavily rockdusted, then the roof and the triangular stumps left in the fender are shot. When the cave occurs, the rock dust is scattered throughout the face area, thus reducing the hazards of coal-dust clouds. A breaker line of posts helps control the caving.



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Many letters were received, each praising the performance of the crusher. For example, here is a chart taken from one of the letters, showing the results of a test run of coal, again proving Gundlach's superiority in minimizing the percentage of carbon and oversized coal.

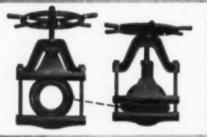
	3" x 114"	4" x 11/4"	4" x 3"	4" x 3"
1" plus	6.64	6.14	8.25	4.46
1" × 34"	20.82	23.39	22.92	20.27
34" × 1/5"	35.84	33.37	31.17	31.02
1/4" × 1/4"	23.02	20.55	18.34	22.04
14" x 16"	7.24	8.81	9.01	10.50
16" x 0"	6.44	7.74	10.31	11.71
Totals	100.00%	100.00%	100.00%	100.00%

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Messrs, Gracie and Van Sant told of other observations, turned up in the course of their work, as follows:

 When a bolt-supported pillar starts to work, it works harder and longer then those supported by wood.

2. It is important to induce caves if the advantages of bolting are to be

Prolonged shutdowns do not adversely affect production in bolted areas.

SHORT-DELAY BLASTING

Several hundred tests performed in the Pittsburgh coal seam and 14 tests in the drawslate above the seam at the Bureau of Mines' experimental mine, Bruceton, Pa., show that:

1. Short-delay multiple blasting in coal using permissible explosives can be accomplished with no less safety than single-shot blasting if the permissible charges are properly stemmed, loaded and fired as recommended by the Bureau.

Such blasting was found to be less time-consuming than single-shot blasting, and the workmen were not obliged to re-enter the dusty atmosphere and be exposed to the weakened roof so frequently.

3. Short-delay multiple blasting possesses advantages in quantity of coal obtained per pound of explosive, in the quantity of float dust produced and in roof disturbance. Blasting in the drawslate was found to be as safe as blasting

These were major results reported by Dr. Lewis on tests conducted in cooperation with Dr. Irving Hartmann, chief, dust explosions and coal-mine experiments branch, USBM. The results are based upon tests in which the charges were set off in the presence of an explosive gas-air mixture at the face, and in a few instances, in the presence of a coal-dust cloud. The effects of shooting in solid coal and in undercut and sheared faces also were studied. The number, giameter, spacing and length of shotholes, the dimension. weight and placing of cartridges and the position of the detonator, the delay time between successive shots (from 10 to 125 ms), and the amount of stemming also were investigated.

Although Dr. Lewis emphasized the fact that his report did not imply official approval by the Bureau of short-delay blasting, it was brought out in the discussion by James Westfield, chief, Health and Safety Branch, USBM, that the tests were conducted with that pos-

sibility in mind.

It must be recognized, Dr. Lewis warned, that only competent, well-trained men should be employed in such work, that shotfiring devices of adequate capacity be employed and that circuit resistance be controlled by strict limits.

New Books for Coal Men

Better Care for Batteries

Storage Battery Technical Service Manual. Here, in non-technical language, is help in installing and maintaining storage batteries and making battery repairs. Mostly, the book is slanted toward automotive batteries. 44 pp. 30c per copy, Association of American Battery Manufacturers, 2706 First National Tower, Akron, Ohio.

Water in Anthracite Mines

Surface-Water Seepage into Anthracite mines in the Wyoming Basin, Northern Field, Anthracite Region of Pennsylvania, by S. H. Ash and R. H. Whaite. This study, the third in a series on surface-water seepage, estimates seepage from each of 59 streams overlying the Wyoming basin. It also suggests ways to divert rain water before it drains into mines and to remove seepage water after it reaches mines. USBM, Bulletin 534. 55c per copy, Superintendent of Documents, Government Printing Office, Washington 25, D. C.

How DC Power Works

Direct-Current Circuits, by Earle M. Morecock. This, the second edition of a standard text, includes theory, practical examples and questions and problems on electricity. It is suitable for home study, industrial courses and technical institutes. Understanding of elementary algebra and plane geometry is assumed. 388 pp. 6%29%-in.; cloth. \$5, McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y.

Perry County History

Perry County Kentucky, A History, by Hazard Chapter, Daughters of the American Revolution, compiled by Eunice Tolbert Johnson. For those familiar with the region, here's a book on the settlement, growth and industry of one of Kentucky's coal-mining counties. Included are histories of many of the well-known mining communities in the Hazard field. 286 pp. 6x84-in; cloth \$4.25 postpaid, Hazard Chapter, Daughters of the American Revolution, Hazard, Ky.

Bacteriologic Aspects of Bituminous Coal Mine Effluents, by W. W. Leathen. 8 pp. 6%x9%-in; paper. Free, Mellon Institute, 4400 Fifth Ace., Pittsburgh 13, Pa.

The following publications by the U. S. Bureau of Mines may be obtained free upon request to Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa. All are 8x10%-in; paper; mimeo.

Other Books and Booklets

Preparation Characteristics of Coal From Knott County, Ky., by W. L. Crentz and J. W. Miller. USBM, R. I. 4993. 30 pp.

Estimate of Known Recoverable Reserves of Coking Coal in Allegheny County, Pa., by J. J. Wallace, J. J. Dowd, J. M. Provost, R. F. Abernethy and D. A. Reynolds, R. I. 5003.

Sensitivity of Explosives to Initiation by Electrostatic Discharges, by F. W. Brown, D. J. Kusler and F. C. Gibson. R. I. 5002. 7 pp.





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Among the Manufacturers

E. M. Platts Leaves Joy Post

E. M. Platts, executive vice president, Joy Mfg. Co., Pittsburgh, Pa., for several years, has been obliged to resign because of failing eyesight. Mr. Platts will continue to serve the company, however, having been employed by Joy as a consultant to its executive and board of directors, and will maintain his office in company headquarters in Pittsburgh.

Le Roi Names Research Head

Le Roi Co., Cleveland, Ohio, has placed Spencer Bowman in charge of mining research development, Cleveland Rock Drill Div., to direct the development of a new continuous-mining machine which utilizes the principle of the experimental model developed by Bituminous Coal Research. Mr. Bowman came to the Cleveland Rock Drill Div. from Bituminous Coal Research, Inc., where he was assistant to the director of mining development. It is expected that the first machine will be produced in 1954.

L. Gerald Firth Retires

L. Gerald Firth, internationally known pioneer and authority on specialty steels and sintered carbides, retired Oct. 1, as vice president and director of research for Firth Sterling, Inc., Pittsburgh, Pa., after 39 yr of service with the company. Born in England in 1886, Mr. Firth joined Thos. Firth & Sons in Sheffield, England, in 1910. In 1918 he permanently settled in Pittsburgh, and became works manager of Firth Sterling. From 1933 to 1947 Mr. Firth served as president and general manager of the company. The company has also announced a program to streamline sales and distribution facilities to better serve customers in the Ohio and New York areas. A new office has been established at 200 North Ave., Westfield, N. J., combining the Philadelphia and New York offices at one headquarters. The New York and Philadelphia telephone service will be maintained, however. Howard M. Dawson is manager of the Mideastern district. The Ohio District office has changed its address to 2250 Euclid Ave., Cleveland 15, Ohio. Stuart A. Smith is district manager.

Hercules Names New President

Hercules Motors Corp., Canton, Ohio, has elected John C. Keplinger, executive vice president since 1948, president of the firm, succeeding Charles Balough. Joining Hercules Motors in 1926 as sales manager, Mr. Keplinger became vice president in charge of sales in 1931. Mr. Balough, the new chairman of the board of directors, was one of the organizers of Hercules, founded in 1915, and has been a director of the corporation since its organization in 1923, and president since 1929. Mr. Balough succeeds Gordon Mather, now retired. Lawrence G. Downey, with Hercules since 1940 as sales engineer, and G. W. LaSalle, who

joined the engineering department of Hercúles Motors in 1928, and has served in various engineering capacities, have been named vice presidents. F. H. Geisler has been appointed director of sales. Joining the firm in 1931, he was appointed assistant sales manager in 1944 and sales manager in 1948. Dr. E. A. V. Horiak has been named chief engineer.

Euclid Ups Sales Heads

The Euclid Road Machinery Co., Cleveland, a subsidiary of General Motors Corp., has promoted V. L. Snow, formerly manager, domestic sales, to the position of director of sales, succeeding E. F. Armington, who is resigning from active service but will continue to serve as a sales consultant. Mr. Armington headed Euclid's sales for 22 yr. Mr. Snow, domestic sales manager since 1949, has been a member of the Euclid organization since 1935 in various management capacities. J. E. Ehlert, with Euclid 8 yr, has been named to succeed Mr. Snow.

Atlas Powder Moves Salesmen

Atlas Powder Co., Wilmington, Del., has named George W. Thompson, manager of the Seattle, Wash., explosives sales district since 1948, assistant to W. E. Collins, director of explosives sales, in Wilmington. Emmett G. Easterly succeeds Mr. Thompson, and James M. Ellis, Portland, Ore., salesman, replaces Mr. Easterly as Seattle special representative. Mr. Thompson, who joined Atlas in 1934 as a junior salesman, served





COAL MEN ON THE JOB . . .

Johnstown Coal & Coke Co., Crichton No. 4 Mine, Nicholas County, West Virginia

DAY-SHIFT CLASS (top photo) in the USBM Accident Prevention Course for Supervisors, with Lloyd G. Fitzgerald, USBM mining engineer, Mt. Hope, instructing. All section foremen except as noted: Wade Ross, Clarence McClung (rear), Leonard Wood, Mr. Fitzgerald (standing, rear), Charles R. McClung (seated, center), O. O. Morton, Dana Russell, timberman; C. C. Morgan, chief electrician; B. W. Conley, cutting-machine operator; J. J. Strader, machine helper; S. L. Hess, P. W. Galeener (front), superintendent; Willard Russell, Flavil M. O'Dell, machine operator, J. L. Breedon, A. D. Blankenship, general mine foreman; and Lloyd Nutter, night foreman.

SECOND-SHIFT CLASS (bottom photo) in the USBM Accident Prevention Course for Supervisors, section foremen except as noted: P. W. Galeener, superintendent; R. L. Butcher, Earl Vaughan, W. G. O'Dell, second-shift tipple foreman; F. H. Stewart, Harold A. McMiller, mechanic; and A. D. Blankenship, general mine foreman.

in various districts before being named New York special representative in 1947 and Seattle district manager in 1948.

Flexible Steel Officers

Milton B. Beach has been named president and general manager, and John P. Ramsey, vice president and sales manager, of the Flexible Steel Lacing Co. Mr. Beach has been with the company for 35 yr, serving as vice president for 22 yr. Before becoming president, he was in charge of product engineering, design, development and research.

Hewitt-Robins Advances Two

Hewitt-Robins, Inc., Stamford, Conn., has named Kenneth L. Way assistant manager of sales operations, industrial rubber products. Mr. Way, with the company 25 yr, was formerly manager of hose sales and development and has been succeeded in that post by Harry Knechtel, with the company since 1940.

Rowand Named Asst. Sales Mgr.

Link-Belt Speeder Corp., Cedar Rapids, Iowa, has named Gordon W. Rowand assistant sales manager. Most recently district representative in Illinois, Michigan and Indiana, Mr. Rowand formerly served as district representative in the Pacific northwest, joining Link-Belt Speeder in 1946.

Allis-Chalmers Advances Lory

Allis-Chalmers Mfg. Co., has named Dwight H. Lory, former assistant to the general manager of the Norwood plants, to assistant manager of the Texrope Drive Sect., located at the company's plant in Cincinnati. Allis-Chalmers also announced the assumption of operation of the Buda Co., Harvey, Ill., as a new division to be operated as "The Buda Co., a division of Allis-Chalmers." Ralph K. Mangan, with Buda for 36 yr and president since 1950, will be in charge of the division, with the title of president and general manager. The Buda Co. will continue to manufacture, distribute and service all items in its regular line of products, it was reported.

MacDonald Vice President

Sterling Engine Co., Buffalo, N. Y., has elected W. A. MacDonald executive vice president. Joining Sterling in November, 1951, as sales manager, he was promoted a month later to vice president—sales. Mr. MacDonald formerly had been associated as vice president with Hupp Motors, Willys-Overland Co. and the Kaiser-Frazer Corp. The appointment of Admiral Curtis S. Smiley, recently retired after 30 yr of service in the U. S. Navy, to its executive staff as assistant to the president, also has been announced by Sterling Engine.

Roebling Picks Sales Manager

Elmer A. Trask has been appointed wire rope sales manager for the John A. Roebling's Sons Corp., subsidiary of the Colorado Fuel & Iron Corp., Trenton, N. J. Mr. Trask, with the company for 29 yr and since 1950 Chicago district manager, succeeds Forest S. Burtch,

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Upson-Walton swaged ferrule swing ropes offer unusual advantages . . .

They're safer. The steel ferrule is swaged on by machine, thus insuring a uniformity and reliability not attainable in connections dependent on human skill.

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 Guyan natural convection heater answers the problem of small, hard to heat places (such as locomotive cabs, crane cabs, pump houses and small offices) requiring a dependable, long life heater.

life heater.

Consisting of corrosion resistant aluminum chromium alloy wire wound on ceramic forms and mounted within expanded steel housings, these heaters can be furnished from 1500 watts thru 7500 watts for 110, 220, 250, 440, 500 volts DC or AC, single or three phase.

The illustrations show the wall and floor type heaters furnished either with or without switches.

Guyan heaters are designed to withstand the hard service and abuse that is commonly experienced in industrial



mins and mine use.

Please advise voltage, wattage required and type heater when ordering or requesting quotation.

For larger areas the Guyan Forced Convection Heater is recommended. These heaters are furnished from 4000 watts thru 15000 watts.

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Another NEFF & FRY Silo for Guyan-Eagle

When coal companies have us erect silos at two or more mines, it's evidence that the silos are useful and profitable. The 24' x 55' Neff & Fry Silo shown here is at the Elk Creek Mine of Guyan-Eagle Coal Co.

Coal from the mine opening is carried on a belt to the top of the silo. A spiral ladder in the silo breaks the fall of the coal. From the silo the coal is conveyed by a reciprocating feeder to the screening plant from where it is hauled to Amherstdale, W Va., for washing and processing.

In the event of an interruption anywhere along the line, up to 600 tons of coal can accumulate in the silo so as to stabilize operations.

Coal is one of the many flowable bulk materials handled in our silos. Our folder, "Bins With the Strength of Pillars," contains much interesting information on the subject Would you like to have a copy?

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SUPER-CONCRETE STAVE STORAGE BINS

named product sales manager of the company's newly formed Construction Materials Dept. Mr. Burtch joined Roebling in 1923 and in the past 10 yr has held various executive sales positions.

U. S. Rubber Appoints

United States Rubber Co., New York, has appointed Kent A. Blakeslee assistant to Warren A. Tipton, general sales manager, mechanical goods division. Mr. Blakeslee, who joined the company in 1950 as a sales training assistant in the mechanical goods division, was divisional production planning coordinator prior to his appointment. U. S. Rubber has appointed three new regional managers and two sales engineers in construction tire sales. Ben F. MacCormack, new Eastern regional manager, will make his headquarters in New York. Henry Hitchins has been appointed sales engineer for construction tire sales in the east, under Mr. MacCormack. C. N. Clabough has been named Central regional manager, with headquarters in Chicago, and Dugald McKinnon has been appointed Western regional manager, with offices in Denver. Joseph Bernat has been appointed sales engineer to assist Mr. Mc-Kinnon in the western region.

Westinghouse Div. Manager

Switchgear Div., Westinghouse Electric Corp., has appointed M. H. Hobbs, manager, succeeding J. B. MacNeill, who has joined the staff of John K. Hodnette, vice president in charge of industrial products. Mr. Hobbs came to the Westinghouse Switchgear Div. in 1922 from the Montana Power Co. and was named manager of the switchgear engineering department in 1944 and assistant manager of the Switchgear Div. in March. 1953. C. M. Laffoon has been appointed assistant manager of the Transportation and Generator Div. A veteran of 38 yr of engineering experience with Westinghouse, Mr. Laffoon, prior to his new appointment, was manager of the Westinghouse generator engineering department.

Link-Belt Names Div. Manager

Link-Belt Co. has appointed Harvey V. Eastling general manager of the company's Pacific Div., San Francisco, succeeding Ralph M. Hoffman, who has retired after 40 yr service. Mr. Eastling, assistant general manager of the Pacific Div. since June 1, started his Link-Belt career in 1925 as chief draftsman at the San Francisco plant, and in 1940 was appointed general sales manager of the division. Mr. Hoffman joined the predecessor of Link-Belt Co. Pacific Div., Meese & Gottfried Co., in 1913, and became president of Link-Belt Co. Pacific Div. in 1943.

General Tire Advances Two

John E. Powers and Howard M. Dodge have been named vice presidents of The General Tire & Rubber Co., Akron, Ohio. Mr. Powers who has been serving as general sales manager of plastics and special products, joined General in 1934 as a territory sales representative. Mr. Dodge joined General in 1936 and started the company's mechanical goods division.



COAL MEN ON THE JOB . . .

COAL ATTORNEYS shown in the Members Room of the United States Supreme Court recently are: Robert E. Lee Hall (left), counsel, National Coal Association, Washington; Robert V. P. Maine, attorney, Clearfield, Pa.; August Gutheim, ICC practitioner, Washington; John D. Amos, attorney, Northern West Virginia Coal Association, Fairmont, W. Va.; and William P. Lehman, Fairmont, W. Va., counsel for the Sharon Steel Corp. and Joanne Coal Co.

Until his recent appointment, Mr. Dodge directed the operation of the company's three plants in the mechanical goods division.

Templeton, Kenly in New Plant

Templeton, Kenly & Co., has moved into its new plant in Broadview, Ill., a single story building containing 96,000 sq ft of space located on a 5-acre tract. The move to larger, more efficient quarters was dictated by the development of new products, particularly hydraulic jacks and pullers, according to the company's president, J. B. Templeton. The efficient one-floor layout of the plant is specially designed to permit smooth-flowing production of all types of Simplex lever, screw and hydraulic jacks, the company reports.

Fleming Named Sales Head

Worthington Corp., Harrison, N. J., has transferred W. J. Fleming, formerly associated with the sale of Plainfield-built concrete machinery, to Worthington's Holyoke (Mass.) works where he will have charge of the sale and distribution of the company's line of portable air compressors and air tools. Paul J. Foley, formerly Kansas City district manager, has been named general sales manager for all Plainfield Works products.

Killebrew Made Div. Manager

Construction Machinery Div. of Clark
Equipment Co., has appointed Clarence
E. Killebrew manager for marketing and
sales. Formerly general sales manager
for The Frank G. Hough Co. until he
joined Clark in 1952, Mr. Killebrew will
be responsible for sales and marketing of
equipment manufactured by the company
including equipment formerly manufactured by Michigan Power Shovel Co.,
which was acquired by Clark in May.
The company also announced the revamping of its leader organization in
the Midwest to handle its newly-acquired

Ross straddle carriers and fork-truck lines. Under the new plan Clark dealers will add Ross products to their regular sales and service activities.

C. R. Daniels Elects Officers

C. R. Daniels, Inc., Baltimore, Md., has announced the election of corporate officials to new posts, as follows: A. L.

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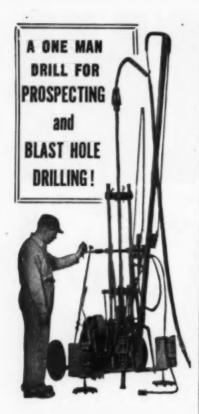
- Model 444 4-Wheel-Drive 4-Wheel-Steer Tractor.
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Hammond, president; E. A. Trumpbour, vice president; F. J. Trumpbour, Jr., vice president; Elizabeth Trumpbour, secretary; and E. A. Trumpbour, Jr., treasurer.

And for Your Information . . .

R. F. Tomlinson, manager, Conveyor Dept., A. B. Farquhart Div., The Oliver Corp., York, Pa., was elected president of the Conveyor Equipment Manufacturers' Association at its 20th annual meeting, Oct. 20, at White Sulphur Springs, W. Va., succeeding Harry C. Davis, general manager, Kanawha Mfg. Co., Charleston, W. Va. Jervis C. Webb, president, Jervis B. Webb Co., was elected vice president; E. E. Boberg, sales manager, Standard Conveyor Co., treasurer, and Russell B. Maas, president, Screw Conveyor Corp., secretary, Directors are: Mr. Davis, Fred S. Wells, vice president, Stephens-Adamson Mfg. Co., and D. E. Davidson, vice president, sales, Link-Belt Co.

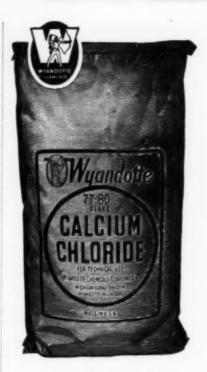
Union Carbide & Carbon Corp., New York, has established a Un'on Carbide senior-year technical scholarship program at 41 engineering colleges and universities. The scholarships, individually sponsored by various divisions of the corporation, will cover full tuition for a student's senior year, plus \$200 for his necessary books and fees, and the selection of scholarship recipients will be made by the universities themselves in accordance with their normal procedures. The senior-year technical scholarships are one part of the corporation's overall program to encourage and assist the education of able students who will be industry's future leaders.

Goodyear Tire & Rubber Co., Akron, Ohio, recently honored H. D. Foster, manager, Industrial Products Div., for his 40 yr of service to the company. At a dinner, the 40-yr service award was presented to Mr. Foster by R. S. Wilson, vice president in charge of sales. Joining Goodyear in 1913, Mr. Foster held various district sales posts until he returned to Akron in 1941 as Mechanical Goods Div. eastern sales manager. He assumed the position he now holds in 1947.

Reliance Electric & Engineering Co., Cleveland, has advanced two veteran company engineers, Paul W. Arnold and Charles R. Sutherland, to newly-created positions. Mr. Arnold, formerly executive assistant to the sales vice president, has been named manager of marketing services, while Mr. Sutherland, formerly manager of large motor engineering, has been appointed assistant chief engineer.

The Thew Shovel Co., Lorain, Ohio, has appointed R. G. Thibaut service manager and C. W. Raby assistant service manager. Mr. Thibaud joined the firm in 1936 as assistant service manager and Mr. Raby, who joined Thew 26 yr ago, formerly was manager of field service.

The Electric Products Co., Cleveland, has appointed N. F. Diederich as manager of engineering, Switchboard & Control Div. Prior to his appointment, Mr. Diederich spent 17 yr with the Clark Controller Co., most recently as manager of engineering standards.



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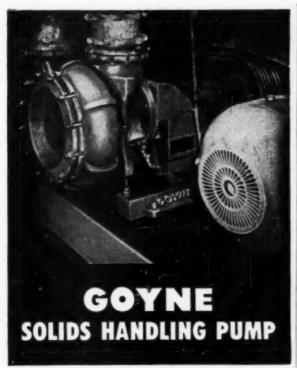
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Liquids with solids added to increase specific gravities for coal and refuse separation in coal preparation plants.

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Pumping prepared coal to temporarily desired storage areas.

These specially designed Goyne pumps incorporate numerous features to reduce upkeep and labor maintenance costs to a minimum;

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- Impeller clearance is adjusted while the pump is running, insuring constant pump capacity so essential for uniform washing.
- 4. There are twenty-eight possible nozzle assembly combinations for each standard pump. Washery designers like this "adaptability feature" as it helps them out of tight places and aimplifies piping.
- 5. Spare parts are carried in stock at our plant for prompt shipment. Reduce your inventory by using Goyne Process Pumps.

All inquiries are given a thorough engineering analysis and our prompt attention.

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Standard Pressed Steel Co., Jenkintown, Pa., this year celebrates its 50th Anniversary and, as a part of its program, has prepared a 24-p book, entitled "50 Years—A Start for the Future." In text and some 60 pictures, the golden anniversary book is designed to show an enterprising, fast-growing company in operation and reveal its policies, practices and purposes in sections devoted to its employees, its products and its progress. A \$10,000,000 program of expansion in machines and building construction is fast nearing completion, the company also reports.

Galion Allsteel Body Co., Galion, Ohio, has appointed Robert R. Sheffer as regional sales manager in charge of the Ohio, West Virginia, Michigan, western Pennsylvania and western New York territory. Mr. Sheffer was formerly with Marion Metal Products Co., Marion, Ohio, as sales representative.

Norton Co. of Canada, Ltd., has named W. Alexander McCune, Jr., general sales manager. Formerly abrasive engineer for the Norton Co. in the northern New Jersey area, Mr. McCune succeeds C. W. Fell who will become an abrasive engineer in the Toronto area. Ill health has forced Mr. Fell to take a less strenuous part in the company's program.

Leschen Wire Rope Div., H. K. Porter

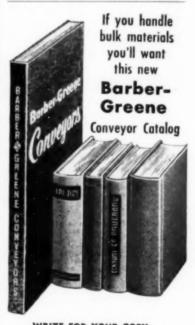
Co., Inc., has established a new sales district covering Texas, Louisiana and Oklahoma, with headquarters in Houston. It is to be managed by F. E. Suder, who has been with the Porter organization in various capacities since 1951.

Euclid Road Machinery Co., Cleveland. Ohio, has appointed Western Tractor & Equipment Co., with headquarters in Seattle, its new distributor for Euclid earthmoving equipment in western Washington and Alaska. Headed by Harry B. Fay, Sr., Western Tractor has acquired a number of equipment franchises formerly held by the Philpott Equipment Co. which has retired from business. John A. Fay is general manager and Noel Caldwell, sales manager.

Rice Pump & Machine Co. has moved to its new manufacturing plant in Belgium, Wis. The new facilities provide the company with three times as much floor space and a plant designed for more efficient service to customers.

Caterpillar Tractor Co., Peoria, Ill., has planned a new parts depot located in Denver, Colo., which is expected to be in operation about Feb. 1, 1954, to improve parts service for approximately 14 Caterpillar dealers in Colorado, New Mexico, Wyoming, Utah, Texas and Montana. The depot will carry a full inventory of Caterpillar parts in a 40,000-sq ft building now under construction on E. 39th St., and will be the ninth parts depot Caterpillar operates.





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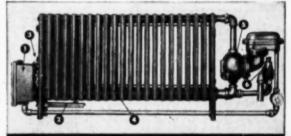
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Excellent opportunity for right man. Stable company and assured future.
In really give age, experience, education, references,

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P9820 Coal Age 330 W. 42 St., New York 36, N. Y.

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ELECTRICIAN & MECHANIC for CONVEYOR MINE with 358 MACHINES

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4 track tripple and shoker screens.

American ring crusher No. 24.

Ottumwa box car loader 30 H.P. motor.

Raifroad car puller.

3 mining machines (coal cutting) Sullivan C.E.

7-30 H.P. -440 velt, 60 cycle.

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1-Electric mine holar G.E. motor 52 H.P. 1600

Ft. 7½ cable.

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36-250-200, 3 phose, 250 KVA form E.K.W.

250 PF-1, 2300 volts, 628 omps, speed 200.

Large assortment of electric motors from 3 H.P.

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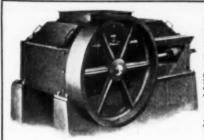
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WANTED 36" CONVEYOR

complete, 1500' used, in A-1 Condition. W9701 Coal Age 330 W. 42 St., New York 36, N. Y.



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 -24" x 24" Jeffrey single roll
 -24" x 36" McNally-Pittsburg double roll
 -36" x 42" double roll
 -30" x 16" Williams pulverizer
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- -5 HP Brownie room hoist -5 HP Sullivan RH room hoist
- 71/2 HP Sullivan double drum slusher hoist
- -10 HP Sullivan 3 drum slusher hoist
- Ingersoll-Rand mod. 6HC air tugger hoist -61/2 HP Sullivan tuggers, 250 v. DC
- -614 HP Sullivan double drum, 250 v. DC -10 HP Sullivan double drum driven by
- Continental gasoline engine

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- Ottumwa 20 HP box car loaders
- 2-Manierre 22 HP box car loaders -Jeffrey 20 HP box car loader
- -Red Devil portable loaders, 12'x15"
 -Card portable loader, 11'x19"

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- Link Belt, 50' centers, 12" flights

 leffrey, 75' centers, 9" flights

 leffrey, 67' centers, 30" flights

 leffrey, 70' centers, 30" flights

 leffrey, 72' centers, 30" flights

 leffrey, 88' centers, 30" flights

- -Jeffrey drag, 28' centers, 9" drags -Jeffrey drag, 26' centers, 30" drags

ROTARY DUMPER

1-Card rotary car dumper, 13'x5' platform



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- 25 HP Vulcan single drum
- -30 HP Vulcan single drum -37 HP single drum
- -50 HP single drum
- -60 HP single drum
- 100 HP Box single drum

- -100 HP Box single drum
 -112 HP Vulcan single drum
 -145 HP Vulcan single drum
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 with 375 HP CE Slipring Motor, 575 RPM,
 complete with controller, grids and mag-
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- 1—8BU loy loader 1—61EW Jeffrey elevating chain conveyors 1—61HG Jeffrey chain conveyor, 200

- -61W Jeffrey chain conveyor, 200' -G-20 Goodman shaker conveyors
- -G-15 Goodman shaker conveyors
- -Vulcan shaker conveyors -loy ladel UN-17 shaker conveyors
- oodman HA duckbills



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- 18-CE7 Sullivan coal cutters
- -CR3 Sullivan coal cutter
- Jeffrey 28A coal cutter
- 6—Goodman 112-A coal cutter
 1—Sullivan CH-11 ironclad shearing machine
- -Jeffrey 29-C Arcwall coal cutter

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- 100 ton Fairbanks railroad scales
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- ing basket

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- screen 42"x72" Jeffrey-Traylor electric vibrating
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- screen 4'x12' Tyler Ty-rock 3 deck shaking
- screen
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- 125-60 cu. ft. Card steel coal mine cars
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2-Joy Shuttle Cars, Model 42D5.

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 -Jeffrey #61 exhaust blowers
 -Jeffrey Aerodyne midget blowers
 -2600 cfm Brown-Fayro exhaust blower
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 1—Link-Belt, 20' centers, 18" pans

 1—Card, 41'6" centers, 30" pans

 1—Card, 51' centers, 48" pans

 1—73' centers, 30" pans

- -73' centers, 30" pans -64' centers, 48" pans



ELEVATORS

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- 1—12' centers, 14"x7" buckets on belt 1—35' centers, 10"x5" buckets on belt

BELT CONVEYORS

- -jeffrey 24"x13' -Barber-Greene, 24"x66'
- 1—Barber-Greene, 24"x135' 1—Barber-Grene, 30"x173'

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- -7 ton Atlas, battery, 36
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 -10 ton Atlas battery, 36° ga.
 -3 ton Whitcomb gas engine driven, 24° ga.
 -2½ ton Jeffrey trolley, 36° ga.
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1-5 ton Jeffrey trolley, 36" ga. 1-6 ton Goodman trolley, 36"

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thoroughly embedded in rubber to pre-vent ply separation.
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Avoid delays in your production schodules!

We carry in stock for your immediate requirements, Conveyor Belting in widths from 8 inches to 48 inches

		Thickness		Type of	
Width	Ply	Top	Bottom Cover	Duck	
8"	4	1/16"	1/32"	28 Oz.	
10"	4	1/16"	1/32~	28 Oz.	
12"	4	1/16"	1/32"	28 Oz.	
14"	4	1/16"	1/32	28 Oz.	
16"	4	1/8"	1/32"	28 Oz.	
18"	4	1/8"	1/32"	28 Os.	
20"	4	1/8"	1/32"	28 Oz.	
20"	5	1/8"	1/32"	28 Os.	
12" 14" 16" 18" 20" 20" 24" 24" 24"	4	1/8"	1/32"	28 Os.	
24"	8	1/8"	1/32"	28 Os.	
26"	5	1/8"	1/32"	28 Os.	
30" 30"	4	1/8"	1/16"	32 Os.	
30"	8	1/8"	1/16"	32 Os.	
30"	6	1/8"	1/16"	32 Os.	
36"	6	1/8"	1/16"	32 Os.	
42"	5	1/8"	1/16"	32 Os.	
48"	8	1/8"	1/16"	32 Oz.	
36" 42" 48" 48"	8	1/8"	1/16"	32 Oz.	

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510 HP at 360 RPM—5 cylinder—14½x18—
type ZDSB—non-reversing—vertical—4 cycle—
cold starting—mechanical injection. Engine
tratally enclosed. Complete with 48" 7 grows
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Two 300 KW, G. E. HCC-6 Retary Converters,
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CUTTING MACHINES

3 Baby Goodman 212AA, 250 volt DC.
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Inflies Goodman General Flectic & West-

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Joy 12BU, type 9E, two 14BU, five 8BU, 7BU & 11BU.

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Joy Shuttle Cars, 65C, 55C and 85C.
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Four 8000 Gal. Tank Car Tanks.
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Mine Cars, 42", 44" & 48" Ga. Drop Bottom
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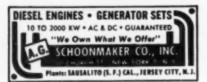
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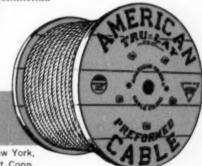
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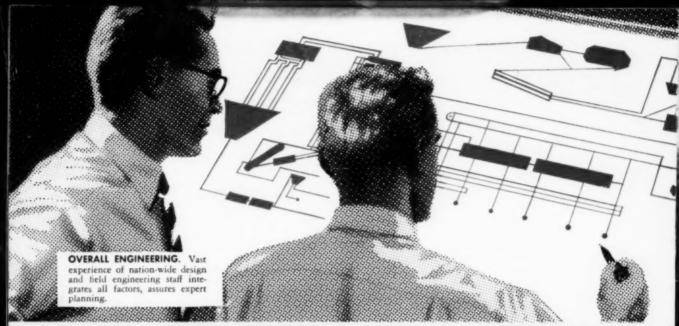
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